

Mining

CONGRESS JOURNAL



MAY
1953





Disposal of 1140 long tons per hour of overburden and lean ore is easily accomplished by this Link-Belt 36-in. wide belt conveyor system.

TOTAL ENGINEERING

It's LINK-BELT's answer for improved belt conveyor performance

BELT conveyor efficiency begins with correct analysis of overall system requirements. And right from the start Link-Belt offers you unique advantages. Our engineers can apply broad experience to your bulk handling problems.

Working with a complete line of quality components, they can select the belt conveyor equipment best suited to your exact needs. What's more, Link-Belt has a nation-wide engineering organiza-

tion that will follow through on every detail. This includes supplying all related equipment . . . building supporting structures and enclosures . . . erecting the complete job, if desired.

It's easy to see why "total engineering" results in top belt conveyor performance. For complete information, call the Link-Belt office near you today.

13,131-D

LINK-BELT

BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales Offices in Principal Cities.

LINK-BELT builds a complete line of belt conveyor components

ALL TYPES OF ROLLER BEARING IDLERS



Impact-cushioning idler

45° troughed idler



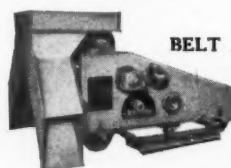
Belt-training idler



20° troughed idler



Return idler



BELT AND MOTOR
PROPELLED
TRIPPERS

COMPLETE
TERMINAL
MACHINERY



Setting the Pace For TACONITE PROCESSING

World's Largest
CRUSHER

THIS GIANT 60 x 109 gyratory crusher now being built in Allis-Chalmers shops will be capable of crushing 3500 tons of low grade iron ore an hour!

It is one of many contributions made since Allis-Chalmers first started the development of equipment for processing taconite ore . . . in the laboratory . . . in the pilot plant . . . and in actual operations on the iron range.

Other metallic ore producers, too, have looked to Allis-Chalmers, *world's most experienced manufacturer of processing equipment*, for crushers, grinding mills, screens and smelting machinery. Allis-Chalmers leadership assures you of equipment recommendations backed by *unsurpassed* experience in all phases of processing.

You'll find the A-C representative in your area a helpful consultant on your processing problems. Call him, or write Allis-Chalmers, Milwaukee 1, Wisconsin, for more facts.

A-3998

ALLIS-CHALMERS



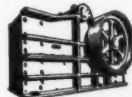
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Throughout the World.



Hammermills



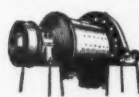
Vibrating Screens



Jaw Crushers



Gyratory Crushers



Grinding Mills



Kilns, Coolers, Dryers

BUDA DIESELS

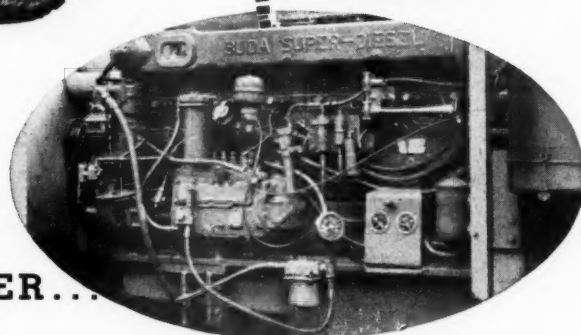
POWER WORLD'S LARGEST TRUCK*

*Based on total tire capacity less net weight.



Model 600 Dart —
60 Ton Capacity.
Powered by two Buda
8 DAS-1125 Super
Diesels

BAGDAD COPPER
Again PICKS BUDA
DIESELS FOR **BIG** POWER...
STAMINA...LONG LIFE!



One of two Buda Super Diesels
powering new Dart 600.

Buda Diesels' superiority was demonstrated again when Bagdad Copper Mines picked two 8 DAS-1125 Super Diesels to power their new Dart 600 truck — called the largest truck in the world.

Deep, open pit mines are tough proving grounds for engines. The Buda Diesels powering other Bagdad haulage units are delivering such stand-

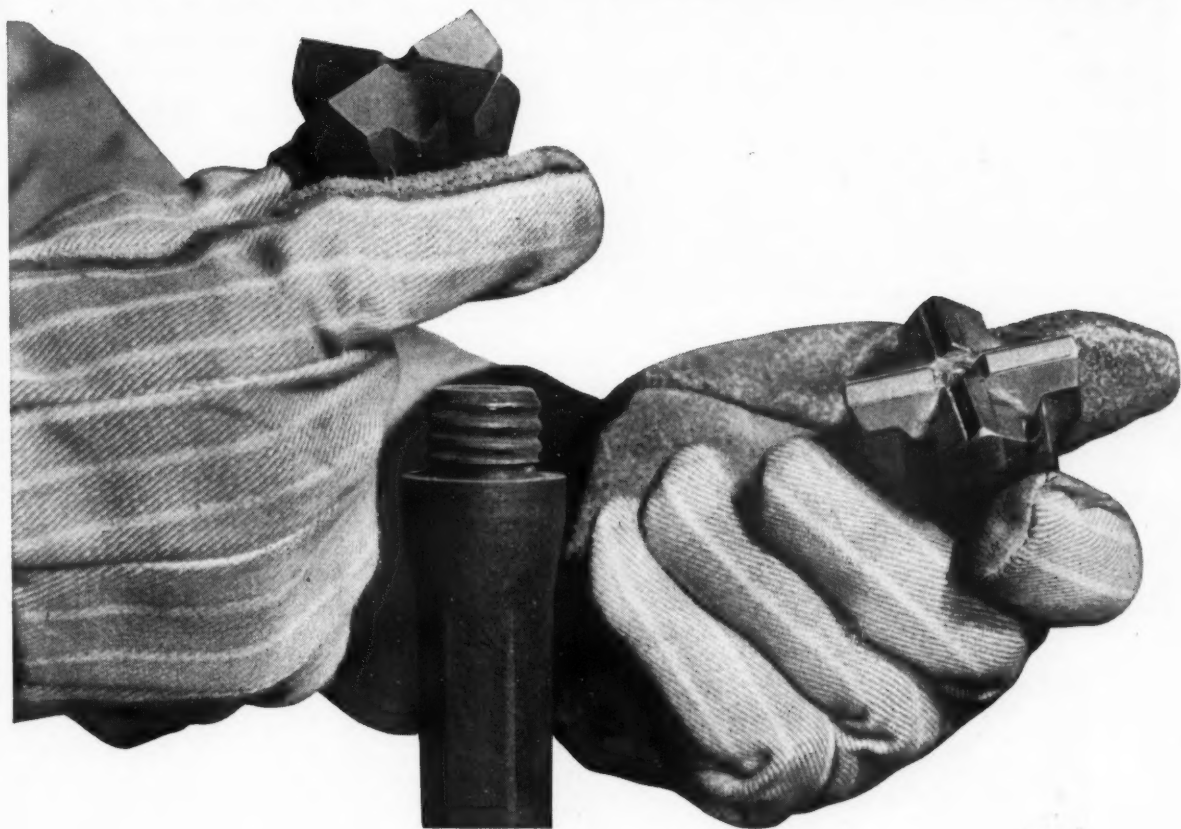
out performance that Buda was the natural power choice for this giant new truck.

Your nearby Buda Distributor can show you how Buda Diesels will increase your equipment performance and profits. Ask him today. Write for Bulletins and data. The Buda Company, Harvey, Illinois.

BUDA

a Power-Full
and Dependable Name
in Engines

NO DELAYS TO CHANGE DRILL STEEL WHEN SWITCHING BIT TYPES!



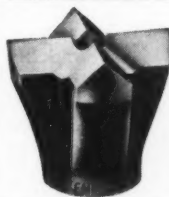
Timken® multi-use and carbide insert bits both fit the same steel

THERE are times when carbide insert bits cut costs. There are times when multi-use bits cut costs. But when it's necessary to change from one bit type to another, Timken® *interchangeable* bits take still another cut out of your costs!

The switch is made and the drilling machine is back on the job in a matter of minutes. The driller doesn't have to take time out to hunt up another set of steels. He simply unscrews one Timken bit and screws the other type right on the same drill steel. No wasted time. You don't need an expensive inventory of steels for each type of bit you use.

Both Timken multi-use and carbide insert bits give you two big extras: 1) made from electric furnace Timken alloy steel, 2) special shoulder union keeps drilling impact from damaging the threads.

We'll gladly send one of our rock bit engineers to your mine, to analyze your drilling problems and point out just where and how you can save by using the right bit types for your jobs. Just write — The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".



WHERE TIMKEN MULTI-USE BITS CUT COSTS

Most economical for ordinary ground. With correct and controlled reconditioning, they give lowest costs when full increments of steel can be drilled.



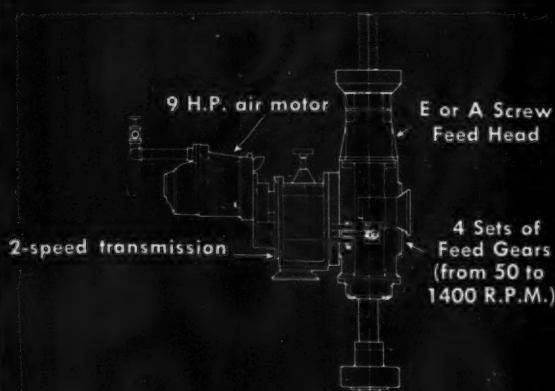
WHERE TIMKEN CARBIDE INSERT BITS CUT COSTS

Give highest speed through hard, abrasive ground. Also most economical for constant-gage holes, small-diameter blast holes, very deep holes.

... your best bet
for the best bit
... for every job

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.



Longyear

PROSPECTOR HI-SPEED AIR DRILL

The ideal light weight drill
for easy use in limited
working areas . . .
. . . for holes up to 500' in
depth.

The Choice of Drill Operators
for Dependability and Economy.



Because of its small size, the Longyear Prospector Air Drill assures successful drilling in spaces of small dimension—in drifts, raises and stopes. Because of its light weight, the *Prospector Hi-Speed* may be quickly set up, with drilling started the moment the motor is connected to the air hose. The duplex air motor transmits a steady flow of power to the drilling bit thereby cutting bit costs and reducing bit wear. This drill has a versatility of uses which include short hole prospecting; drilling blast holes rapidly at low cost; drilling holes for ventilation, drainage or electrical cables; and for grout hole drilling. Prospector Drills are also available in electric and gasoline driven models.

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FOR MAY, 1953

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Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress

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JOY SLUSHERS



Joy AAF-211 double-drum slusher, powered by 15 H.P. electric motor, in operation in a western copper mine, scraping into a grizzly.



Joy E-111 Turbinair single-drum hoist on a timber setting operation in a large western mine.

Joy HL-3 Shovel Loader mucking out a drift round in a western copper mine.

Built with **JOY'S** intimate knowledge of mining problems...they're scraping millions of tons of muck every year



Turbine driven 5 H.P. S-211 slusher scraping ore in a slope in a western fluor spar mine.



Electric driven CFA-211 double-drum slusher in operation in a Tennessee zinc mine.



25 H.P. B-312 electric slusher scraping ore in a large western Canadian mine.

Ruggedly built to stay underground longer, JOY Slushers stand up under the heaviest loads and toughest conditions to give you that high efficiency found only in machines which are *designed* for the job and *proved* in the mine. Check these features: they assure more tonnage scraped per shift and longer life with less maintenance.

- 1 Anti-backlash brakes
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- 5 Universal rope guides and rope guards
- 6 Cast steel skid-type frames
- 7 Large drum diameters
- 8 Easily removable clutch bands
- 9 Simple clutch adjustment
- 10 Gearing enclosed for protection from dirt and dripping water

● There's a JOY Slusher in a size and type for every scraping job. You need only to consult a Joy Engineer to get your answer. He can recommend the best loading equipment for your needs because Joy manufactures the only *complete* line of rock loading equipment for mines . . . slushers, track-mounted shovel loaders, and continuous-type trackless loaders.

WRITE FOR BULLETIN 76-Y

Consult a Joy Engineer

OVER 100 YEARS OF ENGINEERING LEADERSHIP

W&O M3712

JOY MANUFACTURING COMPANY

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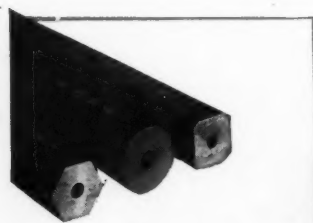
THE DRILL DOCTOR CRUCIBLE HOLLOW DRILL ROD *teamwork in specialties*

The modern, pneumatic rock drill beats out as many as 2000 violent impacts a minute. The man responsible for keeping these drills operating at top efficiency 'round-the-clock is the busy *drill doctor*.

With the high cost of labor and new equipment he knows that to provide good service his drill must be made of the finest steels obtainable. That's why he counts on Crucible.

For Crucible Hollow Drill Rods have demonstrated time and time again their ability to take it . . . to withstand the severest punishment with minimum breakage and bit loss. And Crucible mills are among the few that produce steels that meet the rigid requirements of the rock drill piston — a part that undergoes the toughest service known for steel.

To get the lowest cost per foot per hole in rock drilling, specify Crucible Hollow Drill Rods.



CRUCIBLE

53 years of *Fine* steelmaking

first name in special purpose steels

HOLLOW DRILL RODS

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.
REX HIGH SPEED • TOOL • REZISTAL STAINLESS • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS

The Right Wire Rope
will do the trick!



How do you choose the wire rope for your earth-moving equipment?



EVERY wire rope on your stripping or excavating machinery needs a particular combination of strength, fatigue resistance, and flexibility. Hoist ropes on big power shovels need high tensile strength to absorb impact stresses and must be extremely tough to withstand constant bending over sheaves. On draglines, drag ropes must possess high strength combined with great abrasion resistance. Boom ropes must have strength plus fatigue resistance.

There's an American Tiger Brand Wire Rope that has been especially designed for every grueling rope job that you will encounter. And it pays to

spend a little extra time to analyze your rope requirements carefully and determine exactly which Tiger Brand Rope is the best one to use.

Our experienced Wire Rope Engineers will be glad to help you do this. They know what every Tiger Brand Rope can do and what type of rope every job requires. Their assistance assures you of getting the *right* rope for every job; and that saves you money. Remember, the right rope often lasts up to twice as long as the wrong one. Free engineering service is available through our nearest District Sales Office or by writing to American Steel & Wire, Rockefeller Building, Cleveland 13, Ohio.

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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U-S-S AMERICAN TIGER BRAND WIRE ROPE

Excellay Preformed



UNITED STATES STEEL



Shown at the left is a view of the triple-coil tungsten wire used in many modern fluorescent lamps. (Photo courtesy General Electric Lamps)



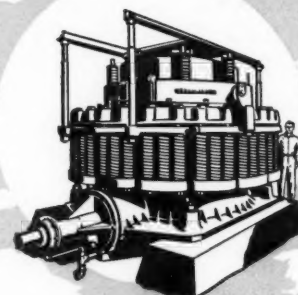
The "ARISTOCRAT OF RARE METALS" might have helped Diogenes . . .

If **TUNGSTEN**, the "aristocrat of rare metals", had been discovered in his time, the Greek Cynic, *Diogenes* might have been able to carry a much brighter lamp to aid in his search for an honest man. For among the many contributions of this metal to modern civilization is the tungsten filament which gives a quality of artificial light otherwise unattainable.

Due to low grade characteristics, and the hard abrasive rock in which tungsten ore is generally found, producers must attain desired particle size for maximum recovery as quickly and economically as possible. It is significant to note the use of **SYMONS® Cone Crushers** by many of the large tungsten producers . . . who find these crushers particularly suited to tungsten ore reduction because of maximum utilization of crushing surfaces against the highly abrasive material, with minimum wear.

Thus, in tungsten operations . . . as in all of the great ore and industrial mineral operations the world over . . . **SYMONS** Cone Crushers are relied upon to efficiently produce great quantities of finely crushed product at low cost.

NORDBERG MFG. CO., Milwaukee, Wisconsin



SYMONS Cone Crushers...the machines that revolutionized crushing practice... are built in Standard, Short Head, and Intermediate types, with crushing heads from 22 inches to 7 feet in diameter—in capacities from 6 to 900 tons per hour.

SYMONS . . . A REGISTERED NORDBERG TRADEMARK KNOWN THROUGHOUT THE WORLD.



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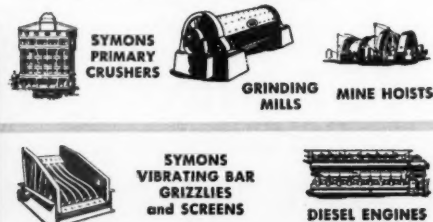
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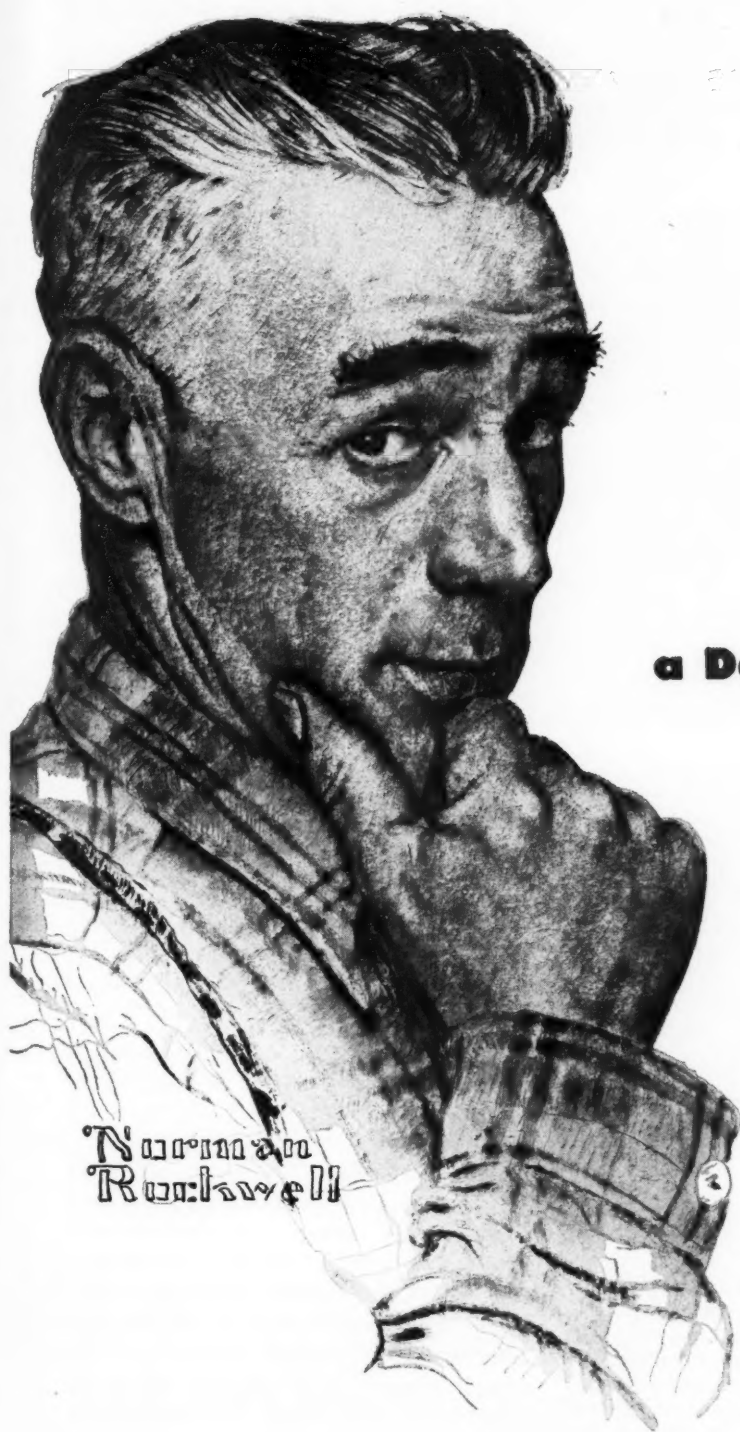


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You?...

a Doubting Thomas?

IF YOU'RE a man who has to be shown, we're right in your corner. Just give Roebling "Blue Center" Steel Wire Rope one try...see for yourself how it saves time and costs you less on the job.

Two out of three wire rope users in the mining field prefer Roebling rope. Call your nearest Roebling office for a Field Man to suggest the best rope for your purposes.

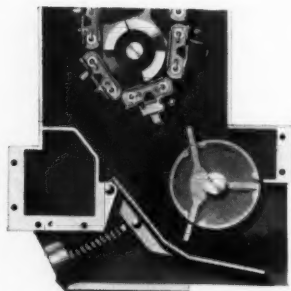


JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE TRENTON 2, N. J.

To meet the wide range **JEFFREY COAL**



Shortwall Cutter with slack-handling device



SLACK HANDLING DEVICE

With this unit, the cuttings are automatically removed and stowed in a slack pile to the right and rear of the machine. No further cleaning is necessary before shooting.

SHORTWALL CUTTERS

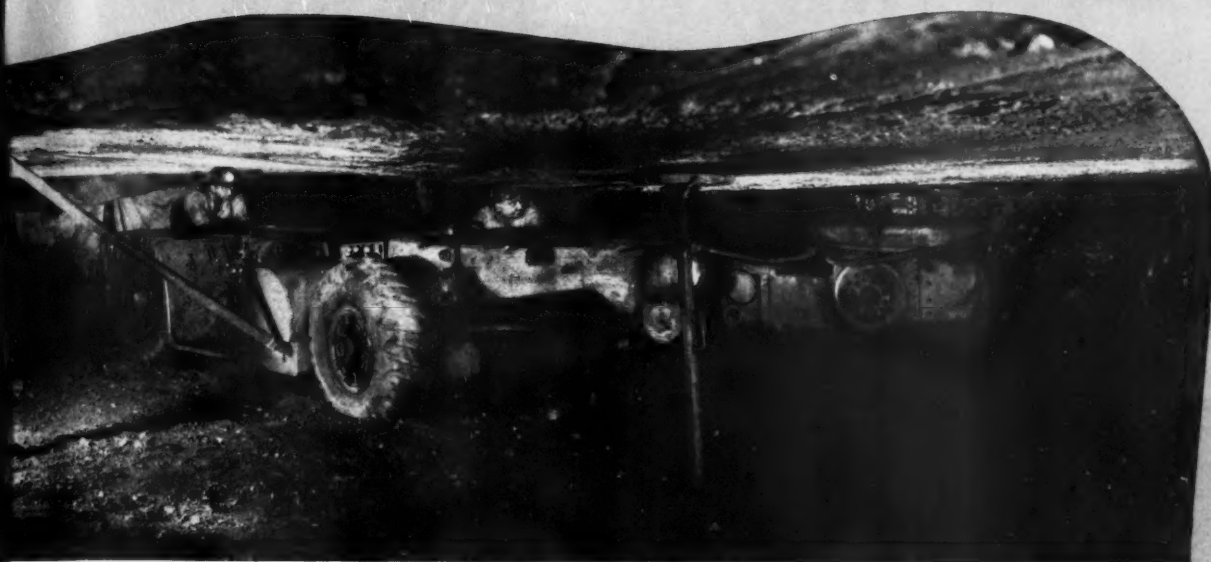
Jeffrey Shortwall Cutters include all the modern features essential to long life, rough usage, high production and low cost operation.

The records of thousands of these machines in constant year-after-year service give evidence of their sturdy construction and dependable low-cost performance.

Movement of these machines is controlled by two power-driven wire rope drums with independent controls. The clutches controlling these drums are easily operated to give quick response to adjustments in position of machine whether in the low-feed speed or high-handling speed.

Coal Cutters to meet individual needs are backed by a competent engineering staff of long experience and every manufacturing facility. Contact a Jeffrey engineer on the unit best suited to your operation.

of coal cutting requirements **CUTTING MACHINES**



UNIVERSAL CUTTING MACHINES

Probably the most popular feature of this Jeffrey Type 70-UR Universal Cutter is its all-around utility. Its cutter bar can be completely rotated in either direction and positioned to make any kind of a cut any place in the seam. From one position, it can make a 30-foot horizontal cut (with a 9-foot cutter bar) or a shearing cut 5 foot, 5 inches on either side of the machine's center line. Maximum top cutting height of a standard machine is 7 foot,

9 inches, but can be furnished to make top cuts up to 13 feet.

The machine illustrated is mounted on large pneumatic tires and equipped with hydraulic steering to facilitate maneuverability regardless of floor conditions.

Jeffrey Universal Cutting Machines are also available with crawlers and in track-type models. Consult a Jeffrey engineer on units best suited to your specific needs.



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**IF IT'S MINED, PROCESSED OR MOVED
...IT'S A JOB FOR JEFFREY!**

ESTABLISHED 1877
MANUFACTURING CO.

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continuous flow, one pass drying with the

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VERTI-VANE

THERMAL COAL DRYER

 *AT* LOW INITIAL COST...LOW OPERATING COST, the Baughman Verti-Vane Drying Unit delivers a uniformly dried and well-mixed product with practically no degradation.

Each unit is designed for capacities ranging from 15 to 75 tons per hour, and handles all coal sizes from 1½" down. Reduces surface moisture to approximately 2% in a single, continuous operation. No re-run is ever necessary.

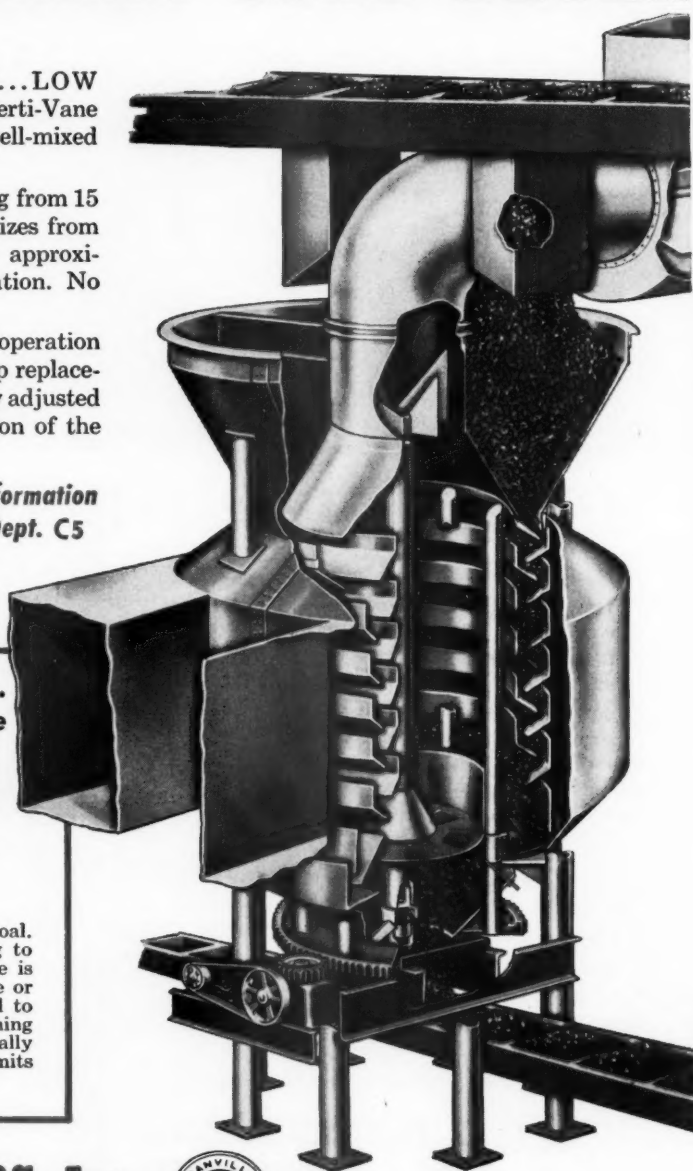
A minimum of moving parts and slow speed operation tend to eliminate shift breakdowns and keep replacement costs to a minimum. Controls are easily adjusted for various feed conditions so that operation of the unit requires very little attention.

*For Free Catalog No. 101 and Complete Information
Write Dept. C5*



*Load bins fast...
avoid breakage
with
HOLMES
LOWERING
SPIRALS*

Eliminates droppage that degrades your coal. Saves wear and tear on bins. Costs nothing to operate (gravity operated). Centrifugal force is utilized to hold coal on spiral... inside edge or "lip" on spiral is unnecessary... allows coal to slide gently off and spread evenly upon reaching peak of pile. Coal flow on spiral is automatically controlled and remains within "safe" speed limits regardless of distance of travel.



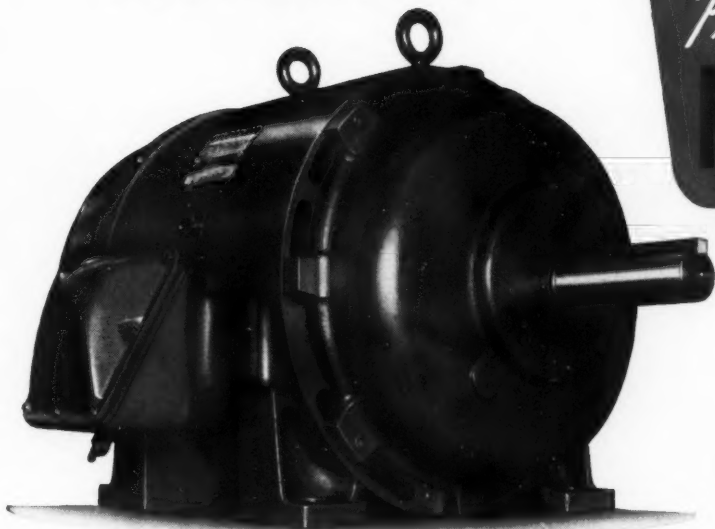
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Manufacturers of: SHEAVES, TIPPLE EQUIPMENT, CAGES, SKIPS, LOWERING SPIRALS, CAR PULLERS AND RETARDERS, DRYERS, LABORATORY CRUSHERS, HOISTS, VIBRATING SCREENS, DUSTOLATORS.

AT RED JACKET, TOO . . . RELIANCE MOTORS PROVE

"All motors are NOT alike!"



Reliance Totally-enclosed Fan-cooled A-c. Motor. All other standard enclosures available, with wide choice of mechanical designs and special mountings. Ratings from ¼ to 300 hp.

Dependable, economical operation of Reliance Motors at the No. 17 Preparation Plant of the Red Jacket Coal Corp., Red Jacket, W. Va., once again is proving that "All Motors Are NOT Alike".

The plant is designed to produce at a capacity of 350 tph. Dependable and continuous service is a crucial factor . . . lost time due to motor failures cannot be tolerated. That's why the designers of this completely modern automatic plant specified Reliance Precision-Built A-c. Motors to drive conveyors, screens, pumps, compressors, crushers, picking tables, reciprocating feeders, and other vital equipment.

You, too, can benefit! Features that have made Reliance Motors "pay off" at Red Jacket will "pay off" for you, too! Heavy shafts, bearing to bearing . . . pressure-cast aluminum rotors . . . shock-resistant frame and bearing brackets . . . man-sized conduit boxes with dirt-proof, moisture-proof seals . . . tough, vibration-resistant "Reli-X" insulation . . . and the best pre-lubricated bearing design on any motor today . . . are among the many features that make these motors the most dependable, most economical that you can buy.



New Red Jacket No. 17 Preparation Plant.

To see for yourself why these better motors will perform better on *your* job, call an Application Engineer at the Reliance Sales Office nearest you . . . or write for Bulletin B-2101.

B-1460



FROM THE SMALLEST TO THE LARGEST, all motor drives in the Red Jacket No. 17 Preparation Plant are Reliance Precision-Built A-c. Motors. Above: A 10-hp. motor powers this spray-water pump. Below: Largest motor in the plant is this 100-hp. unit driving the 12x10-in. circulating pump.



RELIANCE ELECTRIC AND ENGINEERING CO.

1116 Ivanhoe Road, Cleveland 10, Ohio • Sales Representatives in Principal Cities



send just **ONE** man!

Send him into a stope or raise or crosscut.

Send him with a Gardner-Denver S48 Drill and FL2A Feed Leg Mounting.

The time he saves handling this lightweight equipment—plus the drilling pace set by the power-packed S48—will enable him to do a man-sized drilling job every day. See Gardner-Denver Bulletin HHD-11—or write for a copy today.

SINCE 1859

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd.,
14 Curity Avenue, Toronto 13, Ontario

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS

Put This Cost Cutting Specialist on Your Haul Roads



Allis-Chalmers Model D

WEIGHT — 8,800 lb.
BRAKE Horsepower 40
SPEEDS — Four forward, to 25.6 mph.;
reverse to 3.3

THE Allis-Chalmers Model D Motor Grader offers big-grader design and performance advantages. Like big graders, it has tandem drive wheels to provide real earth-moving traction. It also has a shock resistant tubular frame, high throat and axle clearance, ROLL-AWAY moldboard and power hydraulic controls.

And the Model D has many additional advantages for haul road maintenance. Its low original cost — only a third as much as large graders —

its operating economy, size and dependability, make it ideal for this type of work. With the famous Allis-Chalmers 40 hp. gasoline engine, it easily handles all maintenance and light construction jobs. Compactness and short turning radius enable it to work easily in close quarters.

Special attachments — such as the rear-end loader — make it an all-round performer.

See your Allis-Chalmers dealer for all the facts on the low-cost Model D. Start cutting haul road maintenance costs now.



You can count on the Model D to do *more* than maintenance work, for this busy machine has power and traction to handle a good deal of the construction work, too. In addition, its $\frac{5}{8}$ cu. yd. bucket loads excess dirt, fills small gullies and ditches . . . handles many other jobs which would ordinarily call for a specialized machine.

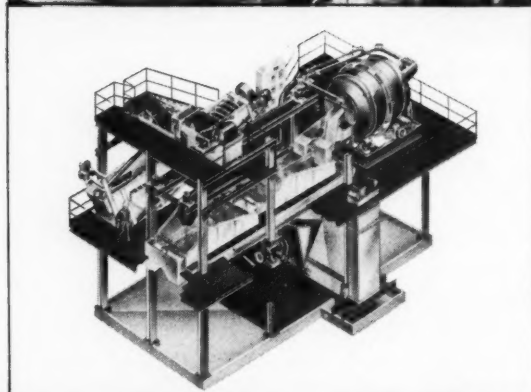
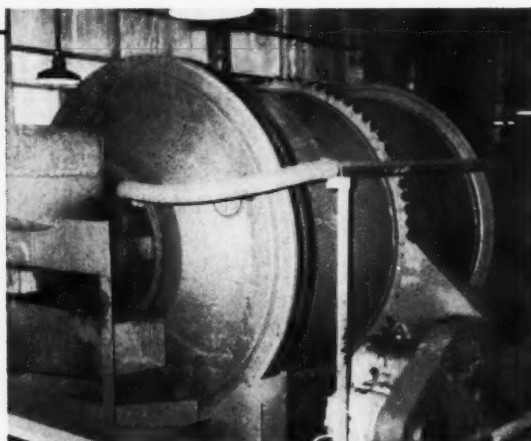
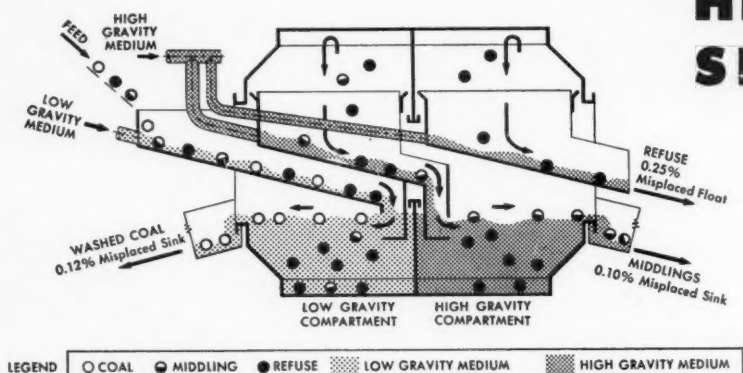
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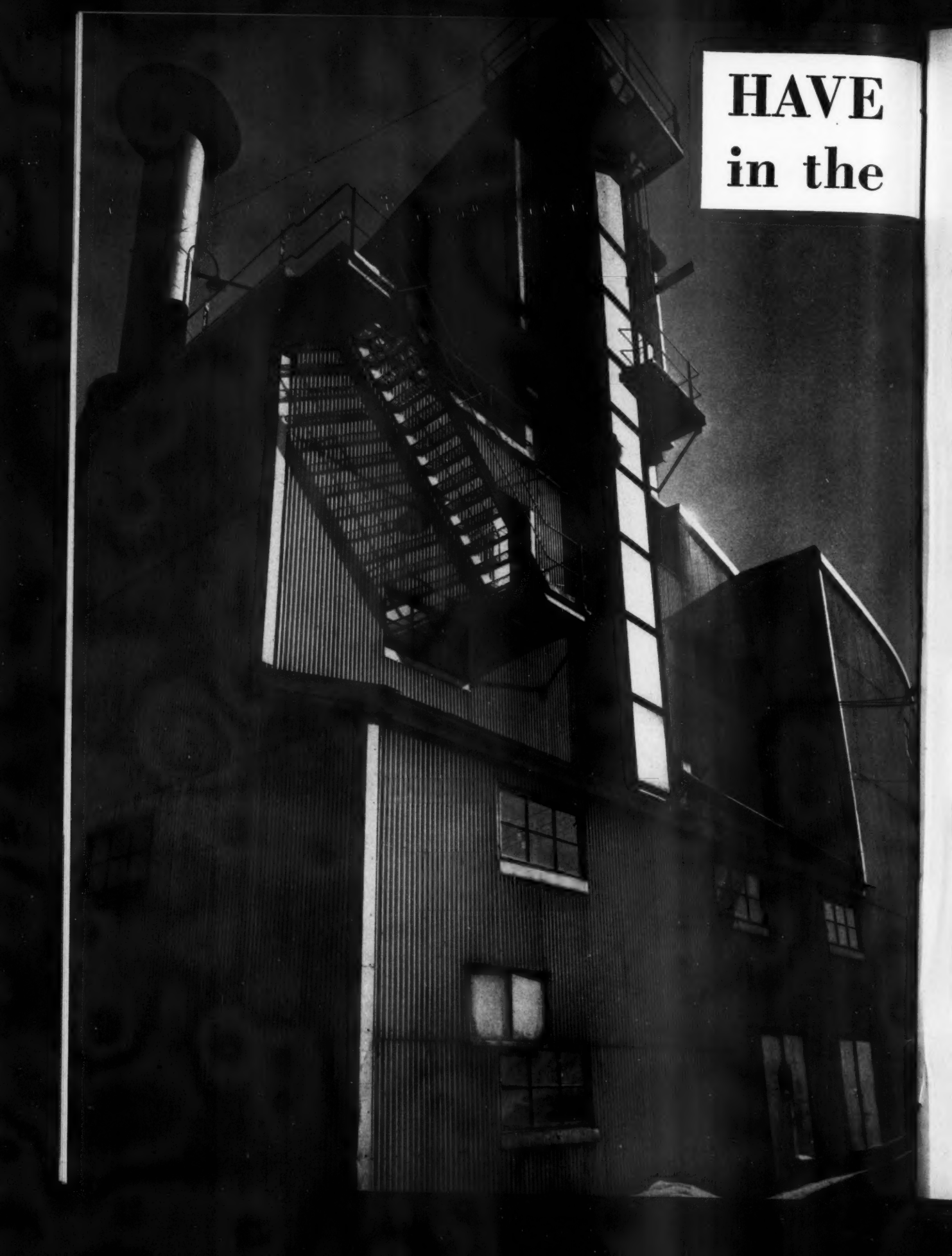
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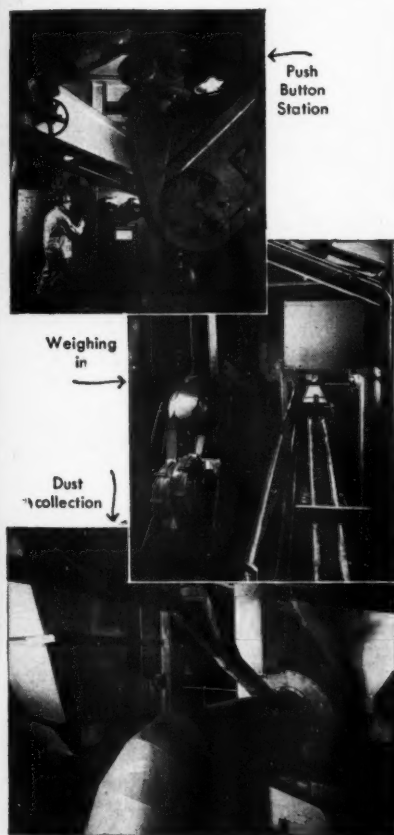
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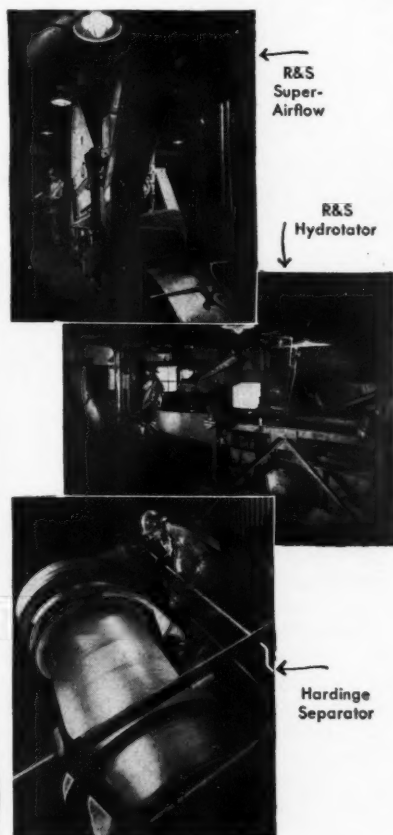
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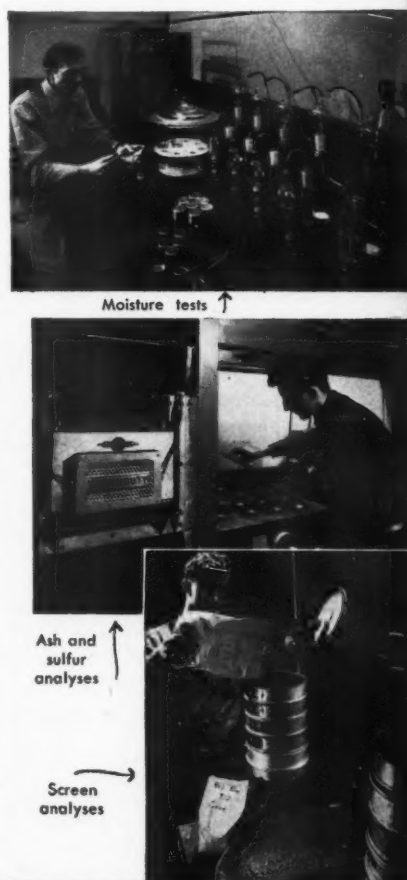
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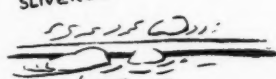
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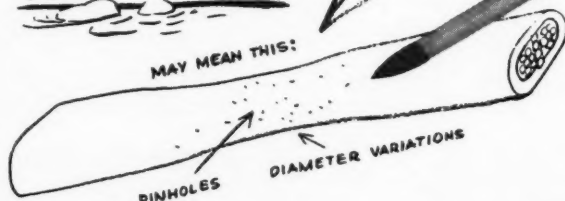
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Editorials

JOHN C. FOX, Editor

MAY, 1953

Return to the American Way

ON THE following pages we report the testimony presented before the House and Senate Labor Committees by spokesmen for the American Mining Congress. In referring to union encroachment on the rights of workers, they stated:

"It should be recognized that with the growth of power of labor unions, the individual worker, union and nonunion alike, has become the helpless pawn of the labor bosses in matters which directly affect his livelihood. This is most apparent with regard to strikes.

"Strikes are costly for all concerned, the public, the employer, the union and the employee. They are least costly to the union and most costly to the worker."

A strike is a test of economic strength. If collective bargaining negotiations reach an impasse where no reasonable solution seems possible, no one denies the workers' right to engage in such a test.

Reasonable men can usually come to a compromise on bona fide issues but sometimes the issues become obscured by emotion. When this happens, the employer who might tend toward unreasonableness is deterred by the ever present spectres of lost production and markets, depreciation of equipment and the wrath of the stockholders. The labor boss, on the other hand, has relatively little to lose economically and much to gain personally.

It is the worker, his wife and children who feel the pinch of an empty pay envelope. They are the ones who suffer from the loss it may take years to make up, if at all, through any wage increase that may be granted as a result of the strike. And there are conspicuous examples where union leaders have insisted on strikes in spite of eminently fair company offers—only to settle much later at wage levels no higher than the pre-strike offer.

Why then do workers stand supinely by while a strike is foisted on them to further the political or far-off purposes of union officialdom rather than their own best interests and those of their fellow workers? The answer lies in the twin evils of compulsory unionism and subversion of the democratic processes by which unions are supposed to be run. While these were both dealt with by Messrs.

Kuzell and Kitchel, it is the second we propose to develop here.

Union officials, it seems, can have almost any strike they want for their own private or political purposes—regardless of the wishes to the contrary of a large majority of members affected. Human nature being what it is, it is not difficult to call a meeting of union members, often at odd hours; dominate the proceedings through a hard core of zealots; call for a standing or voice vote on a confused issue (with it being unhealthy not to vote "right") and then declare that a unanimous strike vote has been authorized by a majority of the membership.

It may sound fantastic but such totalitarian methods are behind many recent strikes. It does happen here—20-odd attend meeting and vote strike authorization for bargaining unit of 200; 300 present at meeting, out of bargaining unit of 1000, opposition booed down and "unanimous" strike vote reported.

Such instances—and they are not isolated—make us wonder where is the Spirit of '76? Why did we fight to make the World Safe for Democracy? Why did our soldiers bleed and die to protect the Four Freedoms? Why are they fighting right now in Korea?

We would like to recommend to the Congress, as did the industry's spokesmen, that while they are amending present labor laws, they seriously consider—along with other changes—a clause calling for an on-the-job secret ballot on the strike question whenever it comes up. We suggest an "on-the-job" vote because in that way all union members will have an honest chance to vote anonymously and free from coercive influence. We further recommend that the vote be conducted and judged by an impartial committee of unimpeachable neutrality.

Such procedure should go a long way toward eliminating unwarranted strikes—else why do top union officials reject so violently all proposals for on-the-job secret ballot votes on whether to strike at all or, when a strike is already in progress, on whether or not to accept a company offer and discontinue the strike?

Do they fear a return to the American way of settling a controversy and prefer the methods of Hitler, Mussolini and Stalin?



Labor agreements should stabilize employment relations for a definite period of time

Recommended Revision Of Taft-Hartley Act

State Case for Mining Industry Before House and
Senate Labor Committees

By **CHARLES R. KUZELL**
General Manager
Phelps Dodge Corporation
and
DENISON KITCHEL
Phoenix, Arizona

PROBABLY never before in the history of this country has a campaign designed to affect legislation, assumed the proportions in martyred self-righteousness and irresponsible falsehood that have typified the campaign conducted by union bosses ever since the passage of the Taft-Hartley Act. Their development of catch-phrases, such as "slave labor law," and their constant repetition of untruths have come as close to the technique used by Hitler to make truths out of lies as this country has ever seen.

The claim that the Taft-Hartley Act has "hurt" organized labor is not true. Since 1946, membership in labor unions has increased by about one million persons. In fact, during the 2½ years subsequent to the passage of the Act the gain in union membership was greater than it was during the 2½ years preceeding its passage.

And as a result of collective bargaining, by November 1952 the average hourly straight time rate of pay in all manufacturing had increased more than 37 percent since the passage of the Act in July 1947 while, during the same period, the cost of living had increased only 21 percent. In addition to this increase in rates of pay, collective bargaining during the past six years has resulted in a host of new "fringe" benefits. In cost to employers and value to employees they represent a substantial sum. The problem of further legislation in the field of labor-management relations cannot be properly considered and solved unless we get down to earth and accept the fact that organized labor has continued to flourish under Taft-Hartley.

During the past six years the public has been put to great inconvenience and expense and the individual worker

has too often been deprived of his right to earn a living by monopolistic strikes which have crippled the economy and created national emergencies.

The public and the individual worker have been forced to pay tribute to the labor bosses, the public in the form of inflated prices, the individual worker in the form of compulsory payments to the union for the right to work. And they both have had their future security jeopardized by the continued presence of Communists and Communistic influences in the hierarchy of labor bossism.

These evils have continued to exist even under the Taft-Hartley Act. This Act was a constructive and timely step in the right direction, but further steps must be taken to curb the evils of labor monopoly, compulsory unionism and Communism in organized labor. As we see it, these are some

Editor's Note

Both Charles R. Kuzell, general manager of Phelps Dodge Corp., and Denison Kitchel of Phoenix, Ariz., have had many years' experience in the field of Labor Relations in all its aspects as they affect employers and employees. They were called upon by the American Mining Congress to appear before the Senate Committee on Labor and Public Welfare and the House Committee on Education and Labor, Eighty-third Congress, First Session, as spokesmen for the mining industry during hearings on revision of the Taft-Hartley Act.

What they had to say is printed as a part of MINING CONGRESS JOURNAL's service to its readers. The full text of their statement covered 68 pages and has been considerably condensed. Main points of their recommendations on revision of the Taft-Hartley Act have been preserved however, together with the reasons for making them. The mining men of America can be proud to have such able spokesmen among them.

of the major problems which emerge when the cloud of falsity is dispelled and the true facts become apparent.

The statement of our recommendations is brief and to the point. We have been authorized, as representatives of the American Mining Congress, to present it to you and to explain in more detail each of the points and the reasons in support of them. With your permission we shall proceed to do so.

Outlaw Compulsory Unionism

We believe that compulsory unionism should be recognized as a major domestic issue facing this country today. If the compulsory unionism recognized and encouraged by the Taft-Hartley Act and the amended Railway Labor Act is permitted to flourish and grow, the entire working force of the nation will eventually become a subservient group dependent on labor bosses for its livelihood, paving the way to labor dictatorship. World history will show that wherever labor has attained this ascendancy national socialism has been instituted.

Let us first dispel the myth that those who oppose compulsory unionism are out to destroy organized labor. Justice Brandeis, known as a great "liberal" jurist and perhaps the most articulate advocate of trade unions, had this to say on the subject:

"The objections, legal, economic and

social, against the closed shop are so strong, and the ideas of the closed shop so antagonistic to the American spirit, that the insistence upon it has been a serious obstacle to union progress."

Later on he wrote:

"They (the American people) will not consent to the exchange of the tyranny of the employer for the tyranny of the employee."

Rebuke to Congress

The Wagner Act permitted the closed shop. The Taft-Hartley Act outlawed the closed shop but permits the union shop. In our opinion, this was merely a political compromise against the movement to outlaw all forms of compulsory unionism. There is no difference in principle or in ultimate result between the closed shop and the union shop. Thirteen states now have constitutional provisions or statutes, or both, which prohibit making union membership a condition of employment. The fact that eleven of those states took this action after the passage of the Taft-Hartley Act is an emphatic rebuke to Congress on this score.

Compulsory unionism is objectionable on two main counts. In the first place it results in a labor monopoly. Secondly, and most important of all, it infringes without justification on the freedom of the individual. There is no place in our economic and political system for association by compulsion. We have agreed as members of society to require ourselves to pay taxes for the support of our government, but we have placed restrictions

and limitations on that government and we elect by democratic processes those who are to govern for us. These are basic essentials in any free society. But when we go beyond that and permit one group within that society to become the compulsory, private government of millions of individual citizens, to exact tribute from them without their consent and to deny them the very basis of existence, the right to work, we are planting the seeds which will ultimately destroy that free society.

If a man can no longer earn a living except by paying dues to a private organization and becoming, without his consent, subject to its laws and its discipline, he is forced to become the subject of a private government in order to live. If he voluntarily joins and remains in a union, that is "government by the consent of the governed." But if he is forced to join, and forced to stay in, that is government without consent which the Declaration of Independence denounces as tyranny.

There is no democracy in a labor organization which everyone is compelled to join and support, which no one can oppose, and from which no one can withdraw except by sacrificing his livelihood. Justice Brandeis recognized this truth when he made the following statement:

"The union attains success when it reaches the ideal condition, and the ideal condition for a union is to be strong and stable, and yet to have in the trade outside its own ranks an appreciable number of men who are



Since 1946, membership in labor unions has increased by about one million

nonunionists. In any free community the diversity of character, of beliefs, of taste—indeed mere selfishness—will insure such a supply, if the enjoyment of this privilege of individualism is protected by law. Such a nucleus of unorganized labor will check oppression by the union as the union checks oppression by the employer."

We recommend that compulsory unionism in any form be outlawed.

Curb Labor Monopolies and Industry-Wide Bargaining

The second item in the program recommended by the American Mining Congress is the prohibition of labor monopolies and industry-wide bargaining.

In 1947, as a result of terrific political pressure exerted by the labor bosses, an attempt by Congress to face up to the problems of labor monopoly and industry-wide bargaining was thwarted at the last moment by a one-vote margin in the Senate. As a reintroduction to the subject it is

"labor monopoly" means the capability of labor bosses to control and thereby to deny to employers, except on their, the labor bosses' terms, the services of all or substantially all of the employees and prospective employees in an industry or substantial portion of an industry. Of course, at its maximum that capability to control and to deny would extend to the entire working force of the nation. Labor monopoly, as so defined, results accumulatively from voluntary membership in unions, with which we have no quarrel, compulsory unionism and the use of such unlawful practices as mass picketing and violence in labor disputes. It is these latter practices which extend the labor bosses' capacity of control to prospective employees and to nonunion workers.

"Industry-wide bargaining" is an all-inclusive term and in certain respects a misnomer. In its "ideal" or "pure" form it exists when one or several unions, acting together, bargain with an employers' association over wages and working conditions for

same as that of the "purer" forms.

"Labor monopoly" combined with "industry-wide bargaining" has given rise to a monopoly in the sense that the word has been used throughout the history of this country and particularly with reference to the combinations in restraint of trade which have been the objects of the anti-trust laws.

Aim of Labor Bosses

The goal of the labor bosses, through control of the working force and the technique of industry-wide bargaining is to restrain, reduce, or eliminate competition in wages and in anything that may be defined as a condition of work involving cost to employers. Wages and conditions of employment are the largest items of business costs. The more employers in an industry who are bound by the terms of such a collective bargaining agreement, the less those major items affect the competitive position of any one of them within the industry, and the easier it is to shift the added expense on to prices.

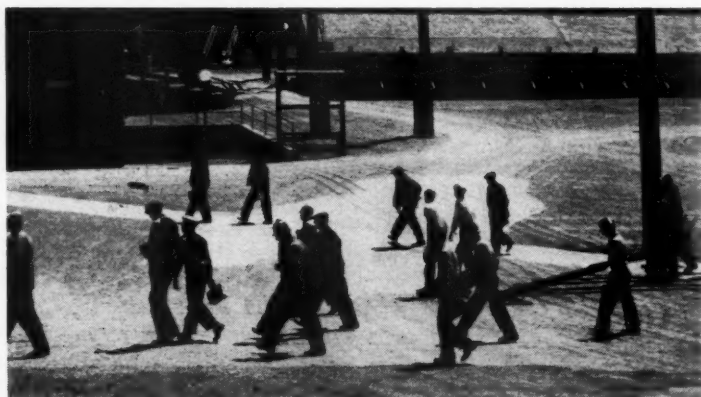
We submit that under the laws governing labor-management relations which have been in effect for the past 17½ years, including the Taft-Hartley Act, the labor bosses have made substantial progress toward their goal, and that their success in eliminating competition in the matter of labor costs in some entire industries has already reached a point which presents as great a threat to our system of free enterprise as existed in the "hey-day" of industrial monopoly which gave rise to the anti-trust laws.

No little assistance to this development has been given by the National Labor Relations Board in its decisions determining the appropriateness of bargaining units under Section 9 of the National Labor Relations Act. Notwithstanding the fact that the law limits the latitude and discretion of the Board to a determination of whether an appropriate unit "shall be the employer unit, craft unit, plant unit, or subdivision thereof," the Board has established units encompassing employees of several employers.

What are the effects of this system of labor monopoly and industry-wide bargaining which the federal laws have fostered so appreciably? Who is affected? We would answer those questions as follows:

(1) The basic element of our national economy, competition, has been drastically curtailed and, as a result of the fixing and standardization of the major items in the cost of doing business, higher prices have been inevitable. The incentive to enter a given field and to produce a better product at a lower cost to the consumer has been substantially reduced. The public is vitally affected.

(2) Large private governments have



Compulsory unionism violates the free American's inherent right to work

perhaps worth while to quote the following from House Report No. 245 on the Hartley Bill, H. R. 3020, introduced during the first session of the Eightieth Congress:

"It is no answer . . . to say that some employers like to combine together to bargain collectively. It is natural that they should dislike having their plants struck while the plants of employers who are competitors, or who ought to be, are operating. Most employers believe that the disadvantages of industry-wide bargaining outweigh its advantages. *Our concern, however, is not with its advantages and disadvantages for either employers or unions. Our concern is the public interest, and the public interest demands that monopolistic practices in collective bargaining come to an end.*" (Italics added.)

Perhaps it would be well to define the terms "labor monopoly" and "industry-wide bargaining." The phrase

an entire industry. The resultant collective bargaining agreement applies to all employers in the industry. In practice, industry-wide bargaining in this extreme form has not been entirely attained. It is closely approached in the bituminous coal and railroad industries.

More common are regional and local systems where all the employers in a particular industry within a given area bargain together with the union or unions representing their employees. Regional collective bargaining agreements in the construction industry are examples of this sort of "industry-wide bargaining."

A more recent form of "industry-wide bargaining" is that which has developed in such industries as steel, automobile, electrical manufacturing, and, to a lesser extent, the western nonferrous mining industry. This is known as "pattern bargaining." The end result of this form of "industry-wide bargaining" is substantially the

been created with unprecedented power to influence and dictate the terms on which our economy shall operate and our lives shall be run, all in the professed interest of the union worker but actually in the interest of the labor bosses, the "industrial barons" of today. The public is vitally affected.

(3) A small group of persons has it in its power and has exercised that power to stop production in entire industries, to shut off the supply of essential goods and to blackmail the government into supporting its cause. Its weapon is the industry-wide strike which, if that power continues unchecked, will before long become the general, nationwide strike. The public is vitally affected.

We submit that the time has come, and the public interest demands, that this "frankenstein" which we have created be recognized, named and dealt with as an aggrandizement of unbridled, selfish power which menaces the continuation of our traditional economic system and our present form of government.

Leads to Socialism

These are not idle words. Other great nations such as Great Britain failed to heed the signs along the way and woke up too late as socialist states. It can happen here unless the Congress of the United States faces up to the facts and acts promptly.

The remedies which we suggest for these problems are not simple. We are aware that the problem of industry-wide bargaining is complicated by the fact that there are some industries in which industry-wide or area-wide bargaining now exists and in which employers, as well as unions, desire to continue this type of collective bargaining. We sincerely feel, however, that dangers to the national security which are inherent in industry-wide bargaining are so great that it should be prohibited.

We recommend the enactment of legislation to combat the evils of labor monopoly and industry-wide bargaining.

Eliminate Communists

The American Mining Congress recommends that we "uproot Communist influence from the internal affairs of unions." In our opinion the non-Communist affidavit provisions of the Taft-Hartley Act were only a gesture toward meeting the need for remedial legislation. They have done some good, but despite them, many unions generally known to be dominated by Communists have continued to receive the support of the United States Government and the privileges and immunities afforded to labor unions under our present federal laws. What is more, to date only one person has been convicted of perjury in con-

Formula for Creeping Socialism Defined

IN replying to questions on the subject of industry-wide bargaining and labor monopoly, Mr. Kuzell told members of the Senate Committee on Labor and Public Welfare that "If I were an evil genius setting about to destroy or overthrow the government of America as we know it today, it occurs to me that I could not design anything better suited to accomplish that purpose without force and violence than has been set up by Congress in the Wagner Act and continued in the Taft-Hartley Act. Those acts permit the industry-wide bargaining unit. Their administrators have encouraged the establishment of industrial type bargaining units in which exclusive representation of all employees is granted to industrial type unions. That is the fundamental cornerstone of the structure which has led to creeping socialism in this country."

Mr. Kuzell, expressing his personal views as an expert in the field of labor-management relations, asserted that industry-wide bargaining carried on through the medium of industrial type unions and bolstered by compulsory unionism was gradually eliminating democracy from collective bargaining. He stated that from the standpoint of the individual wage earner collective bargaining is a form of legislative process designed to enact the code of laws which governs the relationship between the employer and his employees. He pointed out that in the normal legislative process, such as that through which Congress operates, both the majority and the minority are given a voice in the deliberations which lead to the enactment of laws. This, however, is not the case, he said, where industry-wide bargaining by industrial type unions has resulted in denying to millions of wage earners any representation at all at the collective bargaining table. He said that in such situations one union, usually just one person, purports to express the views of all persons in the bargaining unit, when, in fact, as many as fifty percent of the persons who would be bound by the resulting code of employment relations laws may be opposed to those views. As characteristic of this type of bargaining, he pointed out that the final agreement is not between the employer and his employees but between the employer and the all-powerful union.

Mr. Kuzell expressed the belief that if this trend is not checked and if the power of industrial type unions armed with exclusive representation rights is permitted to grow, "we will wake up some morning to find that we have a dictatorial labor government." He pointed out that every national emergency strike which has paralyzed our national economy and jeopardized the national health and safety during the past five and one-half years has been the direct outgrowth of this type of undemocratic, dictatorial collective bargaining. "Other great nations such as Great Britain failed," he said, "to heed the signs along the way and woke up as socialist states. It can happen here unless the Congress of the United States faces up to the facts and acts promptly."

To combat this evil, Mr. Kuzell proposed that the National Labor Relations Board be prohibited by law from establishing plant-wide bargaining units represented by industrial type unions and that democracy be restored to collective bargaining by requiring that bargaining units be limited in scope on the basis of the arts, skills, or crafts of specific groups of employees.

nection with the Taft-Hartley affidavit.

The organized labor movement receives the paramount attention of the Communists in their effort to destroy our national economy and overthrow our existing form of government.

The Taft-Hartley affidavit, although salutary, accomplishes little. Voluntary "house cleaning" by unions accomplishes less. And yet these are the only things that the country has to rely on in the face of this recognized threat to its basic institutions! Every worker, every employer, in fact every true citizen, is vitally concerned, and, in our opinion, the time has come when further delay on the part of Congress to enact affirmative legislation specifically designed to expose and eliminate Communist leadership and domination of trade unions jeop-

ardizes the immediate security of our nation.

We earnestly believe that union members and the American people in general will support the Congress when it is made clear to them that those who oppose such legislation do so only because of their own vulnerability or because of their desire to retain the issue of Communism for private, political exploitation within the ranks of organized labor.

No Union Busting Wanted

We are not advocating a "union busting" program. The vast majority of union members are loyal Americans, just as loyal and conscientious as the members of other groups in our nation. What is needed is legislation whereby the facts of Communist leadership, influence and control can be

established by an impartial, independent governmental agency, guided by precise legislative standards. Once those established facts are made known to union members, they can be given reasonable opportunity to purge their own organizations of subversive leadership before those organizations are denied any rights under the law. Only when approached in this light is the problem susceptible of a solution in keeping with the principles sought to be protected and preserved.

National Emergency Strikes

Our fourth recommendation to the Congress is for amendatory legislation to "Require the President, in threatened national emergency strike or lockout situations, to utilize the provisions of the Act." It is our belief that the national emergency provisions of the Taft-Hartley Act have not been given a fair trial. This is so because of the executive climate in which those provisions have existed since they first became available in 1947.

T-H Injunctions Work

It is difficult to say, as a matter of hindsight, how many strikes threatening or actually causing national emergencies have occurred during the past five and one-half years. The law describes them as those "affecting an entire industry or a substantial part thereof" which "if permitted to occur or continue, imperil the national health or safety." Nevertheless, when one appreciates that during a great portion of the period involved this nation was engaged in an all-out effort to bolster the national defenses, that during two and one-half years of that period we were engaged in armed conflict in Korea, and that from July 1, 1947, to January 1, 1953, there were in the United States 23,073 strikes, involving 11,706,000 workers and causing 213,975,000 man-days of idleness, it comes as quite a shock to know that during that whole period President Truman invoked the national emergency provisions of the Taft-Hartley Act on only ten occasions! It is interesting to note that in seven of the ten instances where they were invoked settlements were reached prior to the expiration of the 80-day period.

In the remaining three instances in which the President saw fit to act: one strike (atomic energy) was settled four days after the dissolution of the injunction; one strike (maritime) was settled with respect to three-fourths of the operations involved before, and the remaining one-fourth twelve weeks after the dissolution of the injunction; and one strike (New York docks) was settled eighteen days after the dissolution of the injunction.

In light of these facts you are obviously being misinformed and misled by those who tell you that, even

where President Truman did use the Taft-Hartley emergency procedures, in most cases the strikes continued beyond the 80-day period, and, therefore, those procedures accomplished little. That just is not true. In two-thirds of the situations in which they have been tested, the emergency procedures accomplished the purposes for which they were designed and resulted in settlements within the prescribed time period.

Before leaving this subject, let us call your attention to the instance in the mining industry where the President did eventually act, but delayed his action without justification and to the substantial detriment of the national safety.

Nonferrous Metal Strike

In the summer and fall of 1951 our armed forces were fighting in Korea. Copper was listed as the strategic metal in shortest supply. Starting in May, the four major producers of copper engaged independently of each other in collective bargaining negotiations with the International Union of Mine, Mill and Smelter Workers, but early in the game the union began to concentrate its efforts on one of the four. Three weeks in advance of the time it took direct action the union announced publicly the date on which it was going to strike the entire industry if that one producer failed to meet its demands.

It was obvious to all concerned that such a strike, if it occurred, would shut off substantially all of the nation's supply not only of copper but also of other strategic metals such as lead, zinc, manganese and molybdenum. All of the Defense Department officials and others who advised the President on such matters were fully aware of the nature and extent of the crisis faced by our defense and war potential under such circumstances. And yet the President failed to act.

The nonferrous mining industry strike of 1951 is a glaring example of the need for further implementation of the national emergency procedures of the Taft-Hartley Act by making them mandatory. The production of strategic metals in critically short supply was paralyzed by a Communist-dominated union at a time when the nation was engaged in an armed conflict with its Communist enemies. In the face of such a dire national emergency, the President of the United States failed to act.

It is also a shining example of the efficacy of those procedures when invoked, for when the President finally did act the crisis was immediately averted.

We specifically recommend that the appropriate sections of the Labor-Management Relations Act, 1947, be amended by substituting the word "shall" for the word "may" in each

instance where the latter word now appears.

Unions Encroach on Functions of Management and Rights of Workers

The next item included in the recommendations of the American Mining Congress is that the present law be amended to "Safeguard, from union encroachment, the functions of management and the rights of workers." This is a two-fold recommendation and for purposes of clarity we shall divide our discussion of it into two parts.

First—the National Labor Relations Act, both before and since its amendment in 1947, has required that every employer who comes within its scope must bargain collectively with labor unions "in respect to rates of pay, wages, hours of employment, or other conditions of employment." Under this broad statutory language the scope of collective bargaining has been extended through judicial and quasi-judicial interpretation to cover almost every conceivable matter pertaining to the operation of a business.

Since all matters pertaining even remotely to rates of pay, wages and hours of employment are by now "in the bag," so to speak, it can be anticipated that under the guise of "other conditions of employment" the unions will step up their whittling on the functions of management. *No board or court can stop them under the present language of the law.*

They will encroach more and more, we believe, on the fundamental functions and rights of management in matters such as the scheduling of production, the size of the working force, the size and duties of the supervisory force, the scheduling of work, the products to be produced, the type and location of plants, the methods and processes of production, the introduction of new equipment and techniques, and perhaps even the business practices and financial structures of employers. They have already gone a long way on some of these matters.

Functions of management must be removed from the field of compulsory bargaining and eliminated as "fair game" for the bureaucrats and the labor bosses. For the same reason we submit that concerted activity to force agreement on any such matters must be denied a protected status under the law.

Second—it should be recognized that with the growth of the power of labor unions the individual worker, union and nonunion alike, has become the helpless pawn of the labor bosses in matters which directly affect his livelihood. This is most apparent with regard to strikes.

Strikes are costly for all concerned, the public, the employer, the union,

and the employee. They are the least costly to the union and the most costly to the worker. It may take the worker years to make up what he loses during a strike, even though the strike results in an increase in his wages. And if you take into account the number of strikes that fail and the number of strikes that are finally settled on the basis of what the employer was willing to agree to at the time the strike started, the whole situation adds up to a dismal picture for the individual workers.

Demand Secret Ballot

We agree that the right to strike for lawful objectives under lawful circumstances is essential to the worker and should not be denied. We think, however, that the time has come to safeguard the right of the workers to participate in the decision of whether or not to exercise his right to strike.

individual worker must be afforded protection beyond that which local law-enforcing agencies are capable of affording. The means of granting such protection will in no way affect those unions which continue to conduct their strikes in a lawful and peaceable manner.

As a step towards accomplishing that end we recommend that the protection of law be removed from any "concerted activities" which are not carried on in a lawful and peaceable manner; that mass picketing, violence, intimidation and similar terroristic devices in labor disputes be designated as unfair labor practices; that employees who engage or participate in such practices be deprived of their status as employees; that the National Labor Relations Board be required to seek injunctive relief in the federal courts whenever it has reasonable cause to believe that such practices

unfair labor practices must be based "upon the preponderance of the testimony." The American Mining Congress recommends the enactment of further legislation to make that requirement fully effective.

The preponderance rule will continue to be meaningless until the Board is composed of reasonable men willing to decide cases upon a sound judicial basis. We recommend, therefore, in order to make more effective the "preponderance of the evidence" rule, that the present National Labor Relations Board be abolished and that a new Board be created to consist of seven members, not more than four of whom shall be members of the same major political party.

Restore Stability to Labor Agreements

It cannot be denied that one of the greatest deterrents to labor disputes, and resulting disruption of commerce, is the existence of labor agreements which, having been achieved through free discussion and collective bargaining, provide a "modus vivendi" for some reasonable period of time.

The labor agreement stabilizes relations in many ways. By establishing rates of pay, hours, overtime premium, shift differentials, holiday pay, vacation pay and similar economic benefits for a definite period of time, it assures the employers of relatively fixed labor costs and the employees of a definite wage so long as there is work to be done.

The provisions which govern seniority, discipline, the settlement of grievances, and the like, afford the continuity of day-to-day conduct which is necessary to a relationship within which management and labor can live together and accomplish their respective tasks.

In addition to the contract provisions themselves, the actual negotiations of an agreement to exist for a specified period tend to focus the discussion of major subjects in the initial and contract renewal negotiations, thus eliminating major controversies during the contract period, and enabling the parties to prepare for the kind of orderly and thorough discussion which best promotes peaceful settlements.

These all seem to be fundamentals of labor-management relations on which all reasonable persons could agree. But not the NLRB. The Board held under the Wagner Act that the obligation to bargain was a continuing one, regardless of the existence of a comprehensive labor agreement. Congress tried to straighten the Board out when it wrote Section 8(d) of the present law. But the Board has nullified that effect by its decisions.

We believe that Congress also intended, by the language it used in

(Continued on page 58)



By November 1952 average pay rate was up more than 37 percent, since passage of Taft-Hartley Act, compared to rise of 21 percent in cost of living

We, therefore, recommend that all workers be given the right to vote by secret ballot before they are forced into economic action which so drastically affects their lives.

Outlaw Mass Picketing and Violence

Our recommendation on this topic reads as follows: "Effectively outlaw mass picketing, violence, intimidation and similar terroristic devices in labor disputes." We submit that the right to strike has been so greatly abused by some unions that the public and the

have occurred and will continue to occur unless enjoined; and that labor organizations engaging in such practices to the injury or damage of the person or property of others be subject to actions at law for damages in the federal courts.

Decide on Preponderance of Evidence

The Taft-Hartley Act placed in the National Labor Relations Act, for the first time, the requirement that opinions of the National Labor Relations Board as to the existence of



Three men build an arch a day without interfering with mine haulage

Arches for Main Haulage Timbering*

Weak Roof Held by Concrete Block Arches at Reasonable Cost

By W. W. DARTNELL

Superintendent
Gibson Mine
Hillman Coal & Coke Co.

ABOUT five years ago the Gibson mine of Hillman Coal & Coke Co. was faced with the problem of finding a better method of timbering and supporting the high places in main haulage entries. Customary practice was to use uprights of various materials to carry cross members of steel or heavy timbers and then to lag or to crib the void or open space between the cross members and the irregular roof.

Mining is in the Pittsburgh seam of coal which is approximately 5½ ft thick with about a foot of drawslate immediately on top of the coal. Above the drawslate there is six to eight ft of strata formed of a mixture of low

grade coal, shale and fire clay and above this is a main roof of sandy shale or sand rock. The mixed strata of coal, shale and fire clay does not have a high structural strength and under several hundred feet of overburden it will flow much like plastic. As a general rule it is only a matter of time until it caves to the main roof. This means a continual cleaning up of fallen material unless some means of support is present.

The breaking down and falling of the strata immediately above the drawslate, after entries and rooms are driven, is often referred to as snaptop. Thirty years ago at mining meetings some of the old timers used to debate whether this roof failure was the result of gas or water pressure. I now believe it is caused by

pent-up stresses in the overlying strata relieving themselves by forcing the weaker strata to flow into any voids created by mining the coal seam. For this reason, we are troubled in high places on the entries, with the sidewalls above the coal seam falling out. Such spalling of the ribs gradually enlarges the area of the entries. This not only creates a hazard, but there is a continual expense in cleaning up fallen material.

Of course, the question will be asked, why hasn't the original roof been caught with steel cross bars? One reason is that there is not enough height for heavy cross bars and lagging. As a rule cross bars that have been set are broken down from the pressure of the overlying strata. It is then only a matter of time until entries fall out to the main roof rock, about 13 to 14 ft above the floor of the coal seam.

Need Lateral Support Also

In connection with the above, several interesting pictures were taken along an old entry in the same seam of coal in the Black Diamond mine near Monongahela, Pa., which show fairly well the result of slow lateral flowing of the weaker strata into the room necks along this entry. This entry was driven about 80 years ago and had caved to the main roof rock. When it was cleaned up, it presented a well preserved picture of what takes place when a weak strata flows from its original position. Room necks along the entry had been back-filled

* Based on a paper presented at the Coal Mining Institute of America, Pittsburgh, Pa., December 11 and 12, 1952.

which prevented the six ft of mixed strata from completely falling and filling the room necks. However, the strata had sagged down on the back-filling in the room necks. The main roof had not moved but was still horizontal while the softer strata under it had flowed into and compressed the back-filling of the room necks. There is only about 200 ft of overburden on this area.

The foregoing picture indicates that it is as necessary to support the side walls to help counteract the horizontal pressures as it is to resist vertical pressures. Because of this, a concrete block arch was developed to support the ribs and top of main haulage entries.

To begin with, it should be understood that these concrete block arches are not a panacea for all the roof problems that might be encountered on main haulage entries but have limited use and are not suited to all types of roof conditions. There must be enough clearance above to accommodate the thickness of the arch which is eight in., plus at least 4 to 6 in. for the old rails used to support the top between arches. The arches are being built in entries that were driven 20 to 30 years ago and have caved, in many places, to a height of 13 to 14 ft or to the main rock roof. Roof bolting might be used, but it would require a large number to permanently hold in place the soft sidewalls and the checkered sections of roof.

The entries have arched unevenly at the top and for this reason it is difficult to use vertical legs and cross members without adding a large volume of cribbing of some kind to fill the irregular void above the horizontal cross members. Much of the later system of roof support has been used at Gibson in the past years, but it entailed the use of large volumes of wood, which if not fireproofed, is a fire hazard. In addition, wood contracts and loses its positive supporting power.

Arches Are Permanent

In the five years that these arches have been used not a single sign of failure has been detected, they have proved their value in preventing roof and rib falls. At first glance this method of roof support for the main haulage entries appears too costly and difficult to build to be practical. In fact, any type of permanent roof support in caved entries is costly, and experience has not proved these arches to be more expensive than other types of permanent timbering. They are very flexible in relation to the height and width of the opening and surprisingly easy to build.

A local building supply company furnishes the 4 by 8 by 16-in. solid concrete blocks for the arches. Blocks



Weight and time have combined to cause the soft strata to flow into old room necks

are made of shot gravel with a top size of $\frac{3}{4}$ in. Official laboratory tests for the blocks show a compression strength of 5000 psi.

Primarily these arches are used to replace the commonly used steel cross members. It is not a continuous arch but is only one 16-in. block wide. Piers supporting the arch have a span of $9\frac{1}{2}$ ft across the entry and give enough clearance for seven-ft equipment. Before building the piers all loose coal and rock is taken down, and if necessary, a channel is dug for the pier. In a few cases the piers have

been placed on top of the coal seam if it is solid.

Piers are built to within about four ft of the highest point of the roof. There, one block is set out about two in. from the face of the pier to support the steel form upon which the block arch is built. One additional layer of blocks is layed on top of the extended block, and then the pier is allowed to set until the following day. A 4 by 4-in. hole parallel to the rib is left in each pier to carry supports for the platform on which the men work.

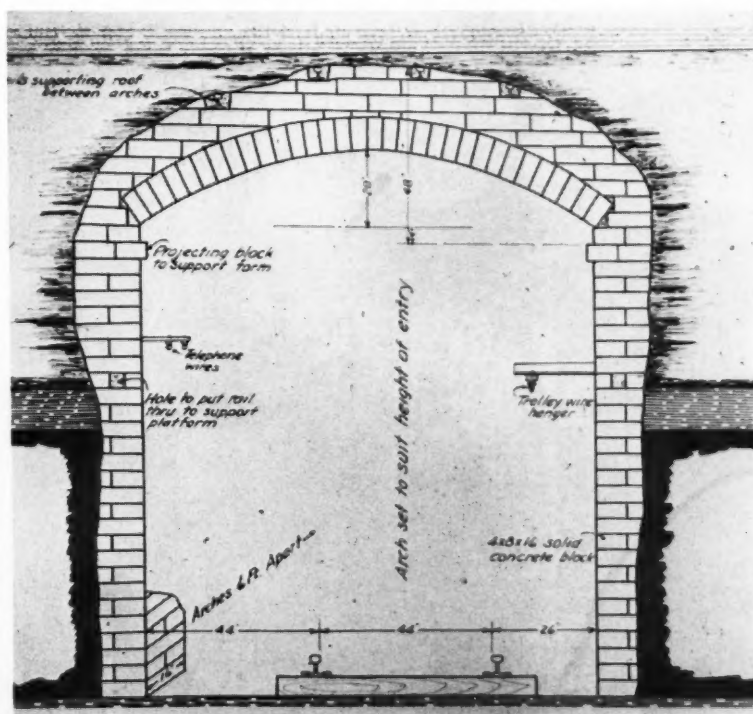


Diagram of concrete block arch for roof support

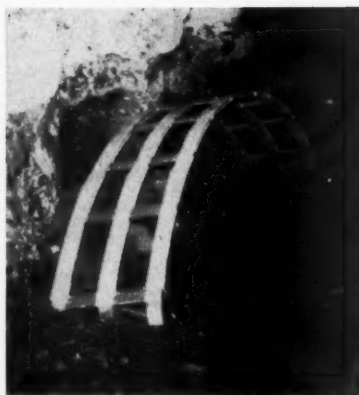
Easy To Build

Five years ago a form for the arch was made of spring steel straps and $\frac{1}{2}$ by 2-in. cross bars. The original form is still in use and to date has been used on over 300 arches and should last indefinitely. The form is made up of three pairs of $\frac{3}{16}$ by 2-in. spring steel straps separated at intervals of 15 in. by $\frac{1}{2}$ by 2 by 16 in. cross pieces of bar steel. The form is welded together into a rather strong frame for its weight. It is light enough for one man to pick up and two men can easily place it in position on the top of the piers and remove it when the arch is set. Although flimsy in appearance, it will carry the weight of the 32 blocks with the wet mortar that make up the arch itself; and in addition, it supports the number of blocks that are needed to fill up the space between the arch and the top of the entry.

While laying the arch the form rests on the projecting block of each pier. For ease in removing it is set on a piece of metal, such as a fish plate, which is knocked out, and by chipping a little from the edge of the supporting block, the form easily drops out.

In laying the blocks of the arch, two brick masons, each starting at the ends of the form, work towards the middle. Thus the weight is distributed evenly as the successive blocks are placed on the form. The men then continue to build the section above the arch to within approximately six in. of the roof, leaving enough room for the rails that span and carry the roof between adjoining arches. After this portion of the work is done, the arch is left to stand until the following day when the form is removed and the rails at the roof are placed and cemented in.

When the men are building the up-



Arch building is simplified by this form which can be handled by one man

per part of the arch, they stand on a platform that is supported by rails extending through the small holes left in the piers. These holes are located at the proper height in relation to the top of the arch so the men can work in comfort. Six-ft lengths of 20-lb rails are placed through the holes and two-in. planks are laid on each side of the piers. On this platform the men pile their concrete blocks and mortar board and are able to move about freely as they work. Usually this platform can be placed high enough to clear the trips that pass below on the tracks. Rubber guards are placed over the trolley wire and feed lines to protect the men from the live wires. By using a timber jack the platform can be moved from one pier to the next without lowering the planks.

Cost Data

It is difficult to give an average unit cost of these arches for they have been built under a number of different conditions. The labor and

material involved in each arch varies with the height and width of the entry. The breakdown of the materials that go into a 13 ft high arch is as follows: the arch itself contains 32 blocks and at a unit cost of 18 cents amounts to \$5.76 for material; the walled-in area above the arch contains 40 blocks costing \$7.20; there are 110 blocks in the two piers costing \$19.80, and the old rails above the arch cost about \$7.00. Total cost for materials with ten percent added for mortar, etc. is \$43.75. Arches are on seven-ft four-in. centers. On this basis the unit cost for material per lineal ft of entry is about \$6.00. On an average, three men will complete an arch each shift, which includes the preparation of the entry—about \$7.00 per lineal ft for labor. This makes a total cost of \$13.00 per lineal ft of entry and compares favorably with other methods of permanent roof support. Of course, unit cost will vary with the height and width of the entry and the lower the piers the less will be the unit cost of both labor and material.

The ultimate of efficiency in this work has not yet been reached; for these arches have been built during the past five years by the men who do brattice work and who also do timbering in the sections and have worked on the arches only when they can be spared from other jobs. This work could be speeded up materially by using more than one form and by having the entry ready for the bricklayers to build the piers, thus finishing more than one arch a shift. This would cut down labor expense.

Time studies taken during one shift reveal that the three men arrived at the location of the work at 6:45 a. m. after spending the 45 minutes getting a car of concrete blocks to the job. In five minutes they had the blocks

(Continued on page 45)



The arch form is seated on two protruding bricks



Old rail is used to support roof between arches



Extensive exploration indicates at least 40,000,000 tons of scarce nickel ore beneath this tropic forest

Discover Big Nickel Deposit at Cuba's Moa Bay

Freeport Sulphur Co. Will Build Pilot Plant Using New Processes For Recovery of Nickel and Cobalt

DISCOVERY in Cuba of a large deposit of nickel ore, a major new source of this critically short metal, was announced by Freeport Sulphur Co.

Extensive exploration recently completed has established the existence, the company said, of at least 40,000,000 tons of nickel ore near Moa Bay about 500 miles east of Havana. Freeport officials believe that, except for certain deposits in Canada, the Moa Bay orebodies constitute the most important proven source of nickel anywhere in the free world.

John Hay Whitney, board chairman, and Langbourne M. Williams, president, said that the company will build a pilot plant for the recovery of nickel and also of cobalt, another scarce and urgently needed metal contained in the ore.

"With practically all the shortages caused by the Korean war now at an end, the scarcity of nickel is the gravest problem still remaining in the field of strategic materials," Whitney told a press conference.

"The whole military defense effort rests primarily on two things—jet planes and atomic bombs. In both of these programs nickel is vitally essential. For example, in some instances a single jet engine requires as much as 2400 pounds of nickel."

Freeport was the first U. S. company to mine and process nickel on a large scale and was responsible for the development of new methods for the recovery of this metal from ores previously unusable. A Freeport subsidiary, Nicaro Nickel Co., designed, built and operated for the United States Government in World War II a \$32,000,000 plant at Nicaro, Cuba, to recover nickel in the form of nickel

oxide from ores owned by the Nicaro company. After the outbreak of the Korean war the plant was reactivated and is now being operated for the Government by another operator.

The new deposit at Moa Bay, Whitney said, averages about 1.35 percent nickel and about .14 percent cobalt. These orebodies, he added, are larger and more valuable than the Nicaro deposits which are now supplying the Government plant.

"The Moa Bay ores can readily be treated by the process developed by Freeport for the Government plant," Whitney said. "However, as a result of extensive research on lateritic ores, Freeport has developed a new and better leaching process involving the use of sulphuric acid."

"Chemical Construction Co., a subsidiary of American Cyanamid Co., has also made important progress in the treatment of nickel and cobalt ores. Among their developments is a process for the production of nickel as metal rather than oxide and also of cobalt metal. Three new commercial plants designed to use this technique are already in operation or under construction."

Combination of the sulphuric acid leaching process and Chemical Construction's metals technique represents a great improvement over the present Nicaro process because it permits the recovery of cobalt and also because nickel metal is more valuable than nickel oxide.

Freeport and Chemical Construction have concluded an agreement to collaborate in this field. The chemistry of the processes has been satisfac-

(Continued on page 57)



Test borings disclosed large new deposit of nickel and cobalt



Here the Traffic Really Rolls

This is the kind of track that gives a mine official no worries at all. It is well planned, well made, well laid out. The part you see here—near, trim, and compact—is typical of the whole system.

It's a Bethlehem prefabricated job, designed not only for present needs but those of the future. Working in close co-operation with the mine owners, Bethlehem studied every detail of the haulage problem; then designed the trackage and made the components. Rails were precurved and precurved, with lengths and radii calculated exactly. Every element, down to the last bolt and nut, was selected to fill a particular need.

The system shows an advanced degree of planning and the highest level of workmanship. It can handle a large

volume of high-speed traffic, with consistently low upkeep expense. It is a system free of the haulage snarls that are often so costly in man-hours and money.

Track like this pays off in a very short time. Why not ask us for full details? We can design and furnish you the whole layout, complete with rails, switches, switch stands, frogs, guard rails, braces, joint bars, and even the fastenings. Call for a Bethlehem engineer; he'll gladly come to your office and tell you how we work.

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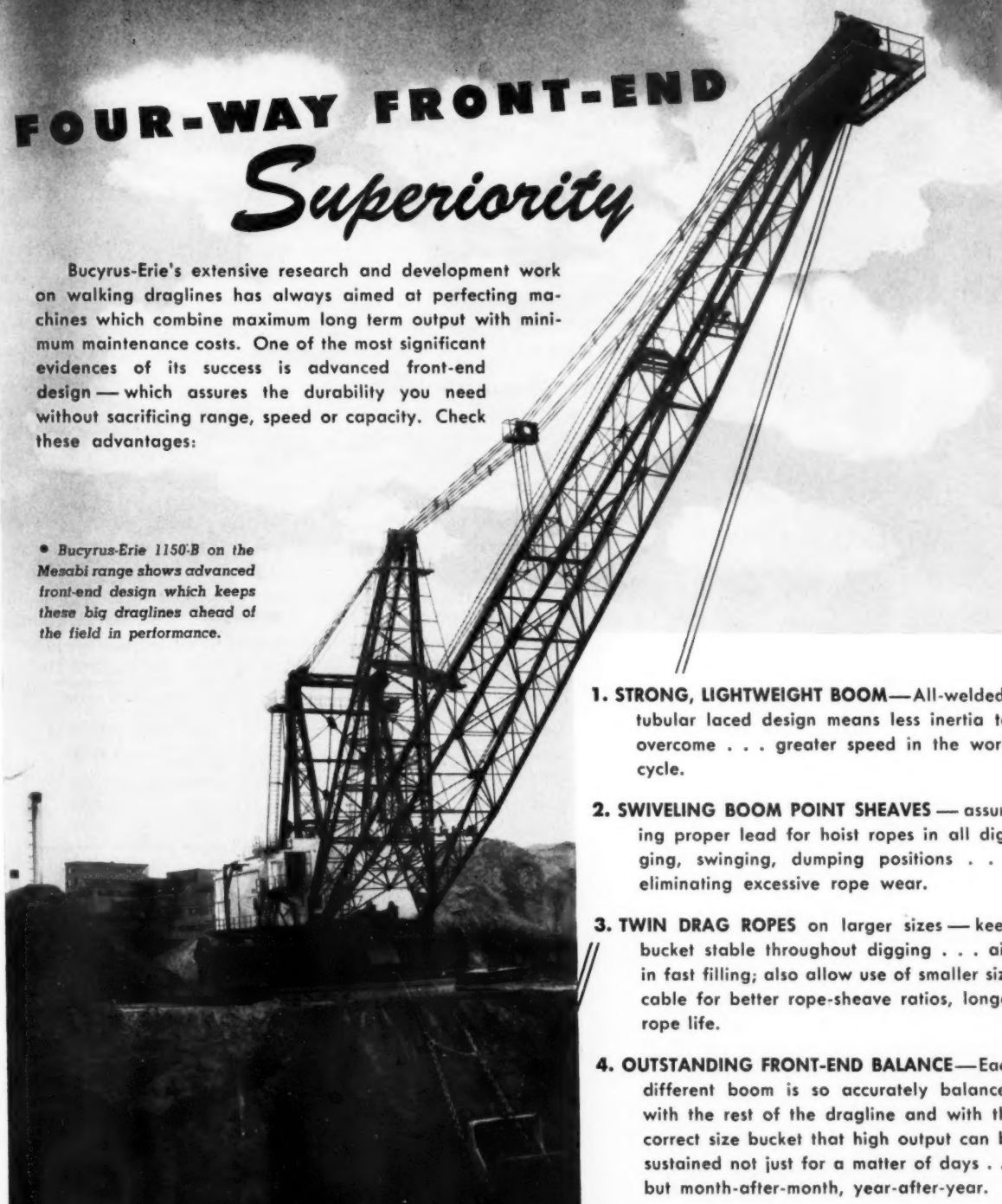
BETHLEHEM PREFABRICATED TRACK

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FOUR-WAY FRONT-END *Superiority*

Bucyrus-Erie's extensive research and development work on walking draglines has always aimed at perfecting machines which combine maximum long term output with minimum maintenance costs. One of the most significant evidences of its success is advanced front-end design — which assures the durability you need without sacrificing range, speed or capacity. Check these advantages:

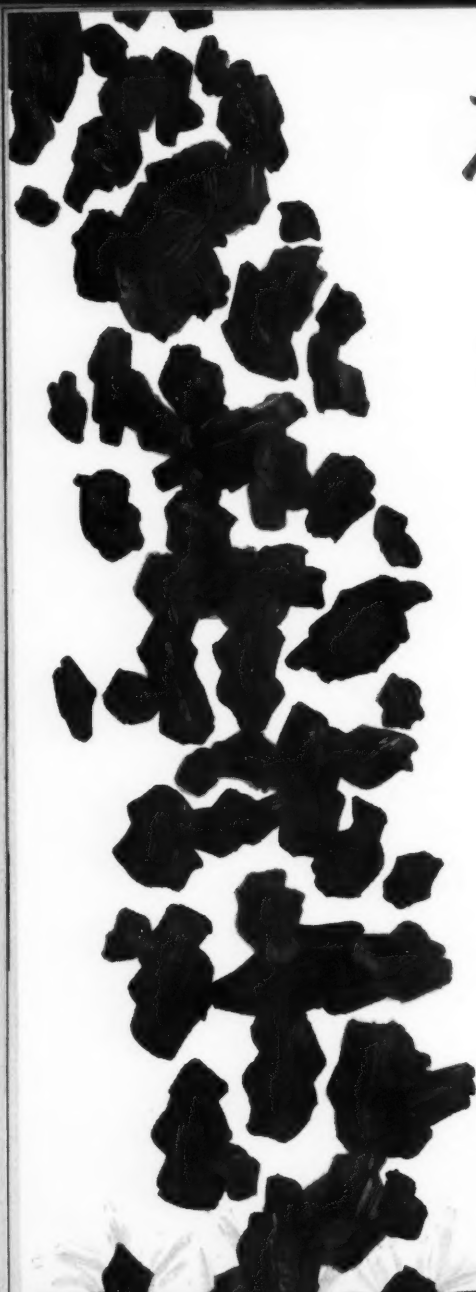
• Bucyrus-Erie 1150-B on the Mesabi range shows advanced front-end design which keeps these big draglines ahead of the field in performance.

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1. **STRONG, LIGHTWEIGHT BOOM**—All-welded, tubular laced design means less inertia to overcome . . . greater speed in the work cycle.
 2. **SWIVELING BOOM POINT SHEAVES** — assuring proper lead for hoist ropes in all digging, swinging, dumping positions . . . eliminating excessive rope wear.
 3. **TWIN DRAG ROPES** on larger sizes — keep bucket stable throughout digging . . . aid in fast filling; also allow use of smaller size cable for better rope-sheave ratios, longer rope life.
 4. **OUTSTANDING FRONT-END BALANCE**—Each different boom is so accurately balanced with the rest of the dragline and with the correct size bucket that high output can be sustained not just for a matter of days . . . but month-after-month, year-after-year.

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The Proof of the Process is in the Profit...

Here's Another Example of How Heavy-Media Separation Boosts the Overall Efficiency of a Coking-Coal Cleaner by Profitable Steam-Coal Recovery from Jig Refuse

Noted for its difficult washing characteristics, the Mary Lee Seam in the Birmingham District comprises two benches separated by 20"-24" of rock middleman. Additionally, the top bench contains several smaller rock partings with the coal badly laminated with boney material. Full-seam mining produces as tough a R.O.M. feed as any preparation plant is ever required to clean.

A 400 t.p.h. preparation plant on this seam was originally designed to wash 3" x 7/16" steam coal on a six-compartment jig, and 7/16" x 0" metallurgical coking coal on tables. Subsequently, it was decided to convert all mine tonnage to low-ash metallurgical coal and to adapt existing cleaning facilities to the new shipping specifications in this ingenious manner:

Separating gravity on the 3" x 7/16" jig coal was reduced and the draw from the secondary refuse gate was increased to an average of 40 t.p.h. in order to eliminate bone and stratified high-ash coal. To offset the greatly reduced recovery, a Heavy-Media Separation Unit was added to clean 30-32 t.p.h. of jig refuse at 1.60. This 1½" x ¼" H.M.S. feed contains a preponderance of near-gravity material. Daily average shift samples for February 1953 analyzed:

Fraction	%	Ash	Cum. %	Cum. Ash
1.40 Float	44.5	11.70	44.5	11.70
1.40S — 1.50F	12.7	21.93	57.2	13.97
1.50S — 1.60F	8.4	36.93	65.6	16.91
1.60S — 1.70F	5.5	38.30	71.1	18.56
1.70 Sink	28.9	65.16	100.0	32.03

How efficiently and profitably does Heavy-Media Separation clean this exceedingly difficult feed? Study these typical results:

	Theoretical*	Plant
Recovery	65.6%	64.4%
Coal Ash (1.60 float)	16.91%	16.29%
1.60 sink in coal	—	1.4
1.60 sink ash	—	32.85
Refuse Ash (1.60 Sink)	60.87%	60.4%
1.60 float in refuse	—	1.7
1.60 float ash	—	31.35

*Calculated from feed

Note that misplaced material averaged less than 1.5%. Note that operating efficiency is 98+% of theoretical perfection. Note also that the H.M.S. Unit recovers over 20 t.p.h. of steam coal with a medium consumption of only 0.78 lb. per ton of feed. Equally important, the H.M.S. unit insures consistent low-ash jig coal by allowing removal of sufficient secondary middling to act as a "flywheel" to compensate variations in quality and quantity of jig feed.

Here is clear-cut evidence of how overall recovery, efficiency and profit can be increased by adding Heavy-Media Separation Unit to an existing mechanical cleaning plant. Obviously, if Heavy-Media Separation can operate so efficiently and profitably on difficult jig refuse and middlings, it can be even more profitable on an average run-of-mine feed. In case after case, the record shows that Heavy-Media Separation recovers 5% or more shipping coal from the same feed.

Why be satisfied with less than maximum recovery from the coal you dig, load, haul and feed to your cleaners? Why settle for less than maximum profit? Remember there never has been and never will be "something for nothing". Lower first-cost mechanical cleaners or modifications of true Heavy-Media Separation cannot achieve ± 0.01 accuracy of separation inherent in true Heavy-Media Separation.

Pre-fabricated Heavy-Media Separation plants to handle from 50 to 300 t.p.h. are available for prompt installation. Larger plants can be designed and erected by several experienced engineering-construction firms.

Whatever size plant you require, Cyanamid will be happy to help you with facts and figures and to cooperate with engineers of your choice on its design. Your request for specific information will have prompt attention from a nearby Cyanamid Field Engineer.

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Diesel trucks underground have been proven economical and safe

Trends in Mechanized Mining

Improved Equipment Helps Miners, but Perfection Not Yet Reached

By SIM S. CLARKE

General Superintendent of Mines
Tri-State Mines Division
The Eagle-Picher Co.

INCREASED mining costs, coupled with the lower grade of ores left, means that there must be no slowing up of efforts on the part of the operators and manufacturers to improve technique, efficiency and better products.

There has been considerable improvement in equipment during the past five years but the ultimate goal in perfection (if such a thing is possible) is still a long way off.

Tri-State Mines Division of Eagle-Picher inaugurated a monthly report system by which manufacturers were furnished detailed reports of worn and broken parts. This accumulated information resulted in certain manufacturers either strengthening or using better material in the parts that failed most frequently. This manifested itself in longer life and lower maintenance costs.

In reviewing the trends in mechanized mining the three major divisions of mining costs—breaking, loading, and haulage—will be treated separately.

Jumbo on Increase

Rock drills mounted on crawler-type jumbos break about 95 percent of the ore. Two rock drills are mounted on a T-head mast from 12 to 20 ft long and hinged to the chassis. This mast has vertical movement actuated by cables through sheaves and spooled by an air tugger.

Some manufacturers are featuring individual drill jib-booms and stress that they are more adaptable to drilling holes in any position and that there is no delay as each drill is independent of the other and there is no delay as would occur when both drills are mounted on the same mast and one driller has trouble in drilling. In our own operations we find that you get just so much footage in a shift and that there is no difference in the drill output on either type of mounting.

A jumbo that is very mobile and entirely satisfactory is made from a diesel-powered front end loader equipped with hydraulic lift that has

outlived its usefulness as a loading unit. The bucket is removed and a cross-arm long enough to mount two drills is fastened to the bucket arms.

Jumbo drilling has permitted this field to stay in operation as the younger generation of miners have had little or no experience in drilling from a post or tripod. If they can drive the jumbo to the heading, they can be taught to drill slab rounds. Much closer supervision is required than was necessary with the old timer.

Latest innovation in jumbo construction is the use of the telescoping mast which permits taking down mineralized roof, trimming loose ground and collaring raises. Two types are in use, one whose mast extends to 35 ft and one that extends to 65 ft.

It was decided to give the large one sufficient base area so it would be stable without the use of guy lines or outriggers. We felt that these would be a serious hazard in case a slab fell and struck one of the guy wires or outriggers. Plastic air hose is being tried on the tall jumbo. Plastic hose is half the weight of rubber and reduces the work load.

Igniter cord has proven very satisfactory as well as safer and more economical than the use of fuse. Roof holes can be primed in the usual manner using short fuse trimmed to suit and connected up to the cord by means of connectors. One line extends to the ground for lighting instead of one fuse for each hole.

	Mine No. 17		Mine No. 21	
	Insert Bit	Steel Bit	Insert Bit	Steel Bit
Holes Drilled Per Drill Shift.....	9.1	6.7	8.4	5.5
Feet Drilled Per Drill Shift.....	90.5	74.6	76.0	43.3
Tons Broken—Life of Bit.....	684.0	6.8	770.0	3.5
Feet Drilled—Life of Bit.....	818.0	5.9	676.0	2.5
Holes Drilled—Life of Bit.....	82.2	1.0	75.0	1.1
Feet Drilled Before Steel Broke.....	428.0	298.0	236.0	90.0
Ave. Depth of Hole.....	9.9	11.1	8.9	7.2
New Bits Per Drill Shift.....	.11	6.7	.11	5.5
Regrinds—Per Drill Shift.....		5.9		10.2
Total—Per Drill Shift.....	.11	12.6	.11	15.7
Bit Cost Per Ton.....	.038	.040	.031	.031
Bit Cost Per Foot.....	.029	.046	.036	.040
Tons Broken Per Drill Shift.....	75.4*	86.00	86.0	56.0
Time Period in Months.....	6	12	10	12

* The lower tons per drill shift at the No. 17 Mine is due to steel bit report covering the entire mine as no stope record was kept on a very hard heading where the inserts were used. Loading reports show increased production.

Choose Bits to Suit Rock

Experiments still continue with different types of drill bits. Owing to the difference in the abrasive hardness of the rock in the different mineralized beds, we have given up the idea that one type of bit can be used advantageously in all mines.

Several mines have been equipped with non-thread, one-use bits, but they did not prove out as we could not drill a ten-ft hole with one bit. Two makes of screw-type detachable bits are in use and are reground for additional use. About 12 drills are using tungsten-carbide insert bits with varying success. In certain formations they have been very satisfactory while in others, particularly the sheet ground

formation, they are not as economical as desired.

Powder men are partial to loading holes drilled with carbide bits as they are smoother and owing to less gauge wear are able to get more powder in the bottom of the hole. Powder consumption per rock ton has been reduced about 3½ percent.

While the recorded comparative costs do not reflect any decided saving in bit costs, intangible savings are quite substantial. The life of drill steel has been lengthened by approximately 70 percent which means that in addition to the shop cost of reshanking or threading, the pounds of steel lost per rock ton mined is also reduced. A saving in powder is very apparent and no doubt the maintenance

cost of rock drills is lowered. It will take a longer period of time to determine that fact.

At some mines where the insert bit costs a little more per ton than steel bits, the additional tonnage broken is reflected in slightly lowered total mining costs.

Loaders Face Heavy Duty

We have never been entirely satisfied with any of the diesel-powered loading equipment that was available. Manufacturers have not been sold on the large potential market for a better loader for use in open stope or room and pillar mines and as a result we have had to use equipment designed primarily for surface work.



Jumbo drilling has had a warm reception. Jumbos such as the one 65-ft. high on the left and the 35-ft. one on the right allow inexperienced men to become drillers speedily

Front end loaders appeared to be the best type on the market when the change was made to truck haulage. Eimco, Allis-Chalmers, Traxcavator and Lodover are in use. Owing to the highly abrasive nature of the chert gangue, maintenance is very high, especially on the crawler pads and chains. The models that cast overhead have a much lower pad and chain cost than the types that have to pivot 90° or more to dump their load.

The main objection to the general type of front end loaders from maintenance costs is the lack of easy access to repair or replace parts. On some repair work, the preliminary work often exceeds the actual replacements by two to three times.

Half-Sole Pads

Excessive pad wear is being reduced by half-soleing the pads with one-in. armor plate. Not all of the welders are clever enough to do a job on this type of work. Manganese steel pads are being tested with good results but the relative cost between manganese pads and welding on of armor plate has not yet been determined.

It would not be fair to any make to publicize loading costs as some of the

was to feed oxygen into the exhaust, where some oxidation took place converting CO to CO₂.

As diesel mechanics and operators gained experience in engine adjustment and manipulation, tests showed that carbon monoxide was not a hazard but the aldehydes and oxides of nitrogen were unpleasant and according to the Bureaus the nitrous oxides were a hazard. A scrubber has been perfected and installed on all units with gratifying results. The atmosphere is clear and all irritating fumes have disappeared.

One of the states issued a stop order on diesel units using a gasoline starting motor. This ruling caused headaches and delays but the condition was corrected by the installation of I.R. 9-BM air starting motors. Some units carry a small air receiver that is sufficient for two or three starts.

Experience has shown that custom-built trucks are cheaper to maintain than trucks from the production line of any of the leading makes as those trucks are tailored for highway work. When failure or weakness develops on any of the custom-built trucks, this can be corrected very easily without upsetting the schedule on a factory production line.

Make	No. of Days Operated	Daily Average Tonnage	High Run
"Cat" Traxcavator	773	453 Tons	1,270
Eimco No. 104	662	489 Tons	1,240
Thew	41	562 Tons	870

units are used for a considerable period each month in building and grading roads. This is very destructive on the units and we do not differentiate between loading and road building, all repairs being charged to loading.

There are approximately 88 miles of roads and some roads are being extended all the time. At the present time, a Thew-Lorain scoop loader on a TL-25 chassis is in operation at the Westside Mine. This mine is the "guinea pig" for testing loading equipment.

The tonnage loading records for three machines operating here are shown above.

Use Diesel Trucks

Truck haulage started originally with electric battery units handling about a six-ton load. Owing to the prejudice and state laws, diesels were condemned without a trial. Finally we obtained permission to try a diesel in Kansas under state and government observation. The results proved that with proper engine adjustment, good fuel and ventilation, the hazards were nil, but to be doubly sure an oxygen dispensing unit was installed on each truck or loader. Its function

was to feed oxygen into the exhaust, where some oxidation took place converting CO to CO₂.

Over 60 trucks are in service. About 20 are semi-trailer units and 40 dump beds. New semi-trailers have a capacity of 15 tons as compared to the old model of 10-ton capacity. Semi-trailers of 20-ton capacity are now on the drafting board.

Four DW10 Cat tractors and W-10 wagons are in use and are performing very well. Factors contributing to this record are short turning radius and plenty of power. The load dumps slowly and does not damage the grizzly as a large load dumped instantly would, especially if it contained large boulders.

Good Roads Vital

Maintenance of roads is vital to low-tire costs. The conventional type of road grader is used in the mines and roads are resurfaced when necessary with mill tailings, which are dumped down convenient drill holes and discharged either into a small hopper or on the ground. Dumping on the ground is preferred as it is not always convenient for the surface trucks to haul when tailings are needed, so they will haul a large quantity when they have slack time, much more than a hopper will hold.

A total of truck operations from the start to December 31, 1951, is given below. This, of course, includes the time required for the roadways to become smooth and well bedded and particularly the grades, some of which are 10 percent, and takes several months to become packed and firm:

Total Truck Months	1,329
Total Tons Hauled	5,440,665
Total Mileage	461,354
Tire Cost Per Rock Ton	\$0.026
Truck and Engine Repairs and Supplies	.024
Total	.050

The importance of good roads is proven in two mines where roads were established by battery trucks before the diesels were put in service, with these results:

	No. 1	No. 2
Number Truck Months	104	69
Tons Hauled	509,624	305,760
Truck Mileage	28,900	18,400
Repairs and Supplies Per Rock Ton	.017	.006
Tire Cost Per Rock Ton	.009	.011
Total	\$0.026	\$0.017

Experience has shown that semi-trailer units are a little cheaper on tires and springs than dump bed trucks.

In drift jobs the Koehring Dumptor is an excellent truck. No time is lost as with a conventional truck backing down the drift. Also, no damage occurs to body or tires as frequently occurs with an average driver trying to back down a drift, particularly an incline.

WORKING DAZE





The 1300-ton hopper at coal level acts as a surge bin between mine and cleaning plant and provides storage capacity

A Complete Belt Mine

**Results of First Year's Operation Justify Selection of
All-Belt Haulage at Large Mid-Western Mine**

By JOE CRAGGS

Assistant Division Superintendent
Peabody Coal Co.

IN July of 1952, the Peabody Coal Co. readied for production one of its most modern coal mines—mine No. 10, located in Christian County, central Illinois. It was designed to produce coal for 30 years at a daily capacity of 13,500 tons. At the present time, it is producing, while operating at part capacity, 11,000 tons daily on a two-shift basis.

The mine was opened in 1951 by a concrete air shaft 350 ft deep and later a 1280-ft slope was connected to the Illinois Coal Bed No. 6, which in this area has an average thickness of 7½ ft. Coal is broken down, on shift, with compressed air and conventional room and pillar methods are utilized throughout the mine. No attempt is made to extract pillars.

Reasons for All-Belt Haulage

Perhaps the outstanding feature of mine No. 10 is the fact that belt haulage is employed as the sole means of transporting coal from the face areas

to the preparation plant on the surface. In several other Peabody mines developed in the post-war period, slope belts had been installed to bring coal above ground. In these same mines, room entry conveyors had been utilized for secondary haulage between shuttle cars and mine cars. So satisfactory was this experience that when No. 10 was in the planning stage, a comprehensive study was made to determine the feasibility of adopting belt haulage throughout the mine rather than utilizing the more common methods involving mine cars and track. Comparative cost estimates were prepared covering operating and fixed charges on various haulage systems which varied in character simply by the degree to which belt conveyors were utilized. In the end, despite the higher initial investment required, the all-belt combination was selected, principally for the following reasons.

(1) Lower man power requirements to obtain and maintain design tonnage.

(2) Reductions in day to day dead-work interposed by brushing, grading and special timbering required for modern, high-speed track haulage.

(3) Higher unit productivity resulting from greater freedom from haulage delays.

(4) Reduced accident costs as compared to previous experience with track haulage.

(5) More effective men and material handling arising from the fact that independent facilities are provided that are separate and distinct from the coal haulage system proper.

(6) Greater over-all efficiency and operating economies resulting from a higher degree of concentration than would otherwise be practical with track haulage.

General Mining Plan

The main slope and air shaft of the mine are located roughly in the center of a rectangular block of coal approximately eight miles long on a north, south axis, and five miles wide. In projecting the working plan, it was decided to develop main entries initially only in one direction off the mine bottom. In effect, this method of opening tends to divide the minable acreage in half; ½ to the south, which is now developing, and the other half, still intact, to the north, where future operations will commence only after depletion of the south reserves.

By adopting this plan, it is believed that better concentration of mining activities can be obtained and maximum realization from belt conveyor investment more readily achieved. Moreover, a one-sided mine, in this instance at least, lends itself more favorably to the future installation of man portals and auxiliary air shafts, factors that cannot be ignored in planning the development of a property the size of mine No. 10.

Accordingly, from the immediate bottom, eight main south entries were driven, four of which are used as intake air courses and four as return airways. These headings were driven for a distance of 1100 ft, at which point sub-main entries were turned off east and west. Future projection plans call for similar sub-main entries to be turned off the main headings at approximately 3800-ft intervals. Sub-main entries themselves are driven in sets of five and are projected to a distance of 9000 ft. This will require the use of three complete belt conveyor units of 3000 ft each. Whenever expedient, it is planned to push these headings to the boundary in order that the room entries along the inbye 3000-ft conveyor line can be worked out as rapidly as possible. This procedure will permit the recovery of a complete 3000-ft conveyor unit to be held in readiness for the unit developing the next set of sub-main entries to the south.

Room entries are turned north and south off the sub-mains and extend approximately 1800 ft. Ordinarily the method used in working room entries is to allow the developing machine, driving the five headings, to reach Room 15. At this time a second production unit is moved in behind the entry unit and commences room work. When the developing machine reaches the entry boundary, it likewise produces from rooms until such time as fresh development is required in a new set of room panels. In this way, territories are worked out very rapidly and roof deterioration is minimized.

1200 TPH Through Slope

In describing the belt transportation system, it would be best to follow the coal flow in reverse, that is, from the surface preparation plant to the face.

Specifications for the main slope belt calls for a delivery of 1200 tph of mine run coal up a 16° slope for a distance of 1729 ft with a total vertical lift of 475 ft. This has been accomplished with a 48-in. steel cable belt equipped with a modified dual tandem drive consisting of three 250 hp motors installed at ground elevation directly adjacent to the slope portal. At present, with tonnage requirements less than those ultimately desired, this belt is traveling at a rate of 465 fpm.



A 50-ft long transfer belt feeds coal from a sub-main entry belt to the main belt, changing the direction of travel and reducing turbulence

The slope belt is loaded by a 48-in. speed-up belt, 50 ft long, located above the tail pulley of the slope belt. This feeder belt, although not absolutely essential, was installed to minimize the wear at the point of loading. For further protection, the loading point of the 48-in. slope belt is equipped with pneumatic impact idlers.

The immediate supply of coal for the slope belt is a 1300-ton concrete storage hopper located at coal level above the tail pulley of the speed-up belt. This hopper serves as a surge bin between the underground belt system and the preparation plant and at the same time provides storage capacity for the developing units, as required, on the third shift. Located at the bottom of this hopper are two Syntron feeders which remove the coal from the hopper and place it on the speed-up feed belt at a rate controlled from the preparation plant.

Mine run coal from the main south

entry mother belt is distributed into this storage hopper by means of a shuttle feeder, manually controlled by an attendant. This conveyor may be described as a 60 in. wide by 90 ft long, track-mounted, traction driven feeder conveyor located above and parallel to the hopper itself.

Extending south from the storage hopper for a distance of 1100 ft is a 48-in. main entry conveyor that transports the entire mine production. This belt, which travels at the rate of 600 fpm, is driven by a 150-hp motor and is made endless by vulcanized splices. Installed between the discharge pulley and the drive assembly, a weightometer records the weight of coal traveling on the belt and keeps a continuous record of the total shift tonnage. The take-up assembly of this belt is the horizontal gravity type and is located just inbye the drive assembly. The length of the take-up is 14 ft. The conveyor line of this belt is of knock-down construction with 12-ft sections fabricated from 6-in. channels, which, in turn, are supported by pedestals placed on 8-ft creosote ties.

Use Transfer Belts

The first, and certainly the most important, junction point in the underground transportation system is located at the intersection of the main south entry and the first east and west sub-mains. Here, from opposite directions and offset by 25 ft, two 42-in. conveyors discharge coal onto a 48-in. transfer belt approximately 50 ft long which in turn delivers the combined load to the main 48-in. belt traveling immediately beneath it. The purpose of this short belt is to absorb the impact of loads transferred to it at 90° from the 42-in. conveyors and to reduce turbulence at this point by speeding up the coal before discharging it onto the main belt. A turning chute is fitted to the end of each 42-in.



The 48-in. main belt travels at the rate of 600 fpm and is powered by a 150-hp motor

belt to facilitate the sudden change in direction of the coal flow. A bar screen, or grizzly, is built into the lower section of each chute to permit the fines to drop onto the transfer belt ahead of the coarser sizes so as to cushion loading impact.

East and west sub-main entries are each serviced with 42-in. conveyors equipped with tandem drives and powered by 150-hp motors. These conveyors are on 3000-ft centers and their pan lines are of the same knock-down construction as the 48-in. main entry installation. These belts are not vulcanized but are made endless by use of fasteners which are sealed with rubber compound and painted.

When installing one of the 42-in. belts, the first step is to establish a sight line for the conveyor and to locate the motor drive. The drive and head pulley are set on a concrete foundation and it is usually necessary to grade out the under clay for setting the forms. Material required for the conveyor line may be brought in and distributed along the belt entry while the drive and head pulley bases are being prepared. After the drive and

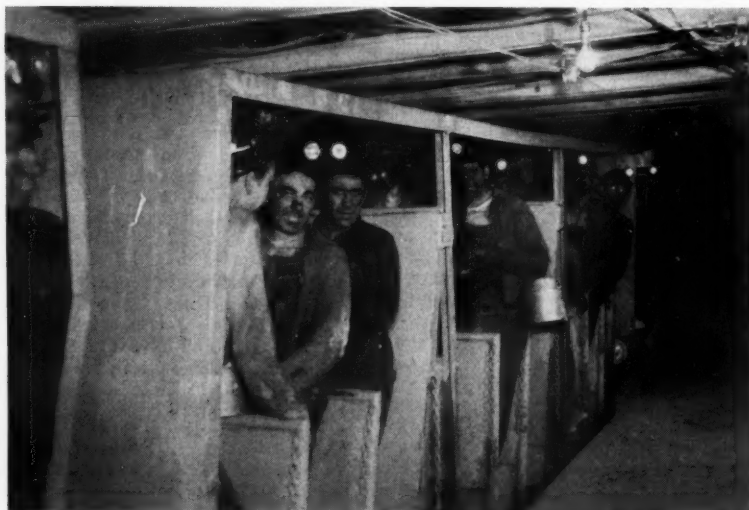
various room territories are the 36-in. room entry conveyors. The latter travel at the rate of 400 fpm and are installed in lengths up to 1800 ft. These belts have a tandem drive driven by one 50-hp motor.

Units developing the east and west sub-main entries use 36-in. belts. In this case, the belt is placed in the entry directly adjacent to the 42-in. belt and the flow of coal transferred to the latter by means of a 36-in. cross conveyor 60 ft long. By using the 36-in. conveyors to service the developing machines, extension of the 42-in. belts may be carried on without interfering with the continued advance of the sub-main entries.

Coal Loading Points

Coal is transferred from shuttle cars to a 36-in. conveyor by three different methods:

- (1) By discharging over the end of the tail section.
- (2) By loading from the side onto the belt, which is equipped with a hinged back-up plate at this point.
- (3) By discharging coal onto an



Special man-trip cars with a capacity of 76 men are used to travel the slope

head pulley are set, the conveyor line is assembled. Belt is threaded onto the drive and over the conveyor line and then trained. Some typical data on the man shifts required for this operation may be of interest.

Drilling, tamping and shooting for forms for drive and head pulley	8 man-shifts
Loading clay from above	4 man-shifts
Building forms and pouring concrete ..	16 man-shifts
Wiring	5 man-shifts
Set drive machinery and 1500 ft of conveyor line with belt.	129 man-shifts
Loading the 42-in. belts from the	

elevating conveyor set at 90° to the pan line.

The latter unit is fitted for automatic belt loading by means of a series of switches which combine to start the empty conveyor as the loaded shuttle car approaches and to operate the conveyor until it has discharged its load onto the 36-in. belt. This permits the shuttle car operator to unload at a high rate and return to the machine before the elevating conveyor completes its unloading cycle. This method of belt loading also contributes to longer belt life since each elevating conveyor is equipped with a balanced angle chute to minimize the distance of drop as well as to turn the coal in the direction of belt travel. Spillage

that ordinarily results from 90° transfer from shuttle car to belt is virtually eliminated by this method of loading, and it is doubtful whether without it Airdox shot coal could be layer loaded from two production units on a single 36-in. conveyor line.

As the production units require, the 36-in. belts throughout the mine are kept as close to the face as practical. Extensions are made daily on the third shift by a six-man crew, which require approximately six hours to complete a 150-ft extension of the conveyor line.

Belt Controls Elaborate

All belts are interlocked so that the stopping of any one belt will result in the stoppage of all inbye belts. The sequence of interlock originates at the bottom hopper where the starting of the shuttle conveyor results in starting all belts in the mine. The interlocking is such that, as each belt approaches full speed, a centrifugal switch is operated to start all other feeding belts. Each individual belt is equipped with controls so that it may be operated in sequence, out of sequence for test purposes, or locked out.

Each belt motor controller has fused short circuit protection, thermal overload protection and acceleration control. Each is also equipped to permit the use of a belt slippage switch. This slippage control consists of a centrifugal switch so arranged that if the belt does not come to near full speed within a definite time interval after power application to the motor, the power is then removed pending investigation or another starting attempt.

Parallel to and throughout the entire length of each belt there is placed an emergency stop circuit so arranged that the maximum distance to the nearest belt stopping device is 100 ft. Other safety devices include "paddle switches," to prevent pile up at discharge points, and limit switches, to warn of belt run-off.

While protective devices are installed generously, fire fighting equipment is not forgotten. Ample supplies of rock dust and dry-type fire extinguishers are placed at strategic points and each belt is paralleled by a 2-in. water line. Hose stations are placed every 200 ft and each station is equipped with 100 ft of 1½-in. hose fitted with a fog nozzle.

Track Haulage For Men and Materials

Unlike many all-belt mines where men and materials are transported on rubber-tired equipment, mine No. 10 employs limited track haulage with specially designed personnel and supply cars. While this may seem some-



Five-ton locomotives serve as personnel cars or ambulance jeeps

what inconsistent, the fact remains that in due course the distance from the main bottom to the working sections will assume major proportions. Consequently, it is unlikely that any material savings in off-track haulage of men and supplies would overcome the substantial increase in travel time resulting from slow going over indifferent roadways that prove costly to maintain.

Mine personnel are transported through the slope by two specially constructed man trip cars, with a combined capacity of 80 men. These cars are coupled to a control car which is permanently attached to the hoisting rope. The control car is equipped with magnetic track brakes activated by a built-in over-speed device or by a push button control in the car itself. This car has five seats and an area available for small tools and supplies. It also has a radio telephone system whereby the hoisting engineer or the attendant at the slope bottom may be contacted at all times.

At the bottom landing the men transfer to underground man trip cars. These cars are of steel construction with an insulated top and have automatic couplings as do all material cars underground. Also provided for the underground transportation of supervisory personnel and injured men are jeeps rebuilt for trolley service from five-ton battery locomotives. Material handling locomotives, as well as the jeeps, are equipped with radio telephones for safe and efficient service.

It has been a very encouraging experience, after years of headaches from handling supplies over single track coal haulage systems, to now have a separate and totally independent artery for material cars to and from the face. It is worthy of note to relate that all supplies are handled underground on shift by four men, who are also responsible for the man trips.

Most of the bulk supplies are handled in packaged units, either in bundles or on pallets that readily lend themselves to cost cutting material handling equipment both above and below ground. Once down the slope, flat bed, stake-sided material cars are directed inside to their proper destination by the bottom cager.

At the end of track, which invariably

Arches for Main Haulage Timbering

(Continued from page 32)

unloaded and piled in place along the entry. During the next 45 minutes or until 7:35 a. m., they worked at getting the platform moved from the pier that had been finished several weeks before. They mixed up the mortar and put some on the mortar board, placed the blocks on the platform and set the steel form on the piers and were ready to start laying the arch. Only 15 minutes were required to place and mortar the 32 blocks on the form and complete the arch itself. This means that only one hour had elapsed from the time they arrived on the job until the arch itself was finished. The next 30 minutes were spent in building up the blocks to within about six in. of the roof. The remaining part of the shift was available for preparing the side walls of the entry for the next set of piers, building another set of piers and placing the rails on the top of the arches that were completed several days previous.

In Conclusion

It is felt that these arches have many advantages over roof bolting, guniting, or the use of steel cross beams with cribs and lagging to fill in the open space above them. Roof bolting has not been tried; but bolts have

ably is just inbye the mouth of a room entry, material is easily transferred to rubber-tired equipment by means of a one-ton electric hoist fitted to a monorail bolted to the roof. Rubber-tired equipment consists of battery type shuttle cars that no longer are used in coal service and which have been remodeled for this particular purpose. By this means, supplies are then taken to the specific locations in the working territory previously designated by the unit foreman on his daily order slip.

System Is Successful

It is felt that the belt transportation system at mine No. 10 has been highly satisfactory during the period it has been in operation. While countless arguments can arise both for and against belt haulage underground, it seems reasonable to observe that when selecting the most economical transportation system, the final choice can be made only after intensive study of the individual characteristics of the particular property in question. In the case of mine No. 10, selection of the belt system has been more than justified by actual mine operating experience and it is felt that future performance will not prove otherwise.

not been used long enough to prove their worth over long periods of time in retimbering old and caved entries, or in keeping the ribs of a soft rock formation from spalling. Guniting was tried in this mine about 15 years ago and none of it is left. Whether the improved guniting is permanent, will only be told by years of trial. Cross supports of steel beams with wood cribbing only created an additional fire hazard and as the wood contracted it let the rock down and loaded up the beams, which had to be unloaded.

During the past five years, 307 of these arches have been built at Gibson mine under a variety of conditions, and so far, there has been no sign of failure detected in any of them. Overburden in the area varies from 200 ft to about 500 ft. Arches have eliminated the former trouble with numerous falls of material from the ribs and roof. In building the concrete block arches, advantage has been taken of the greater strength of materials in compression as against materials in tension; and a permanent structure has been developed that is not affected by rust or decay, is easy to build and not too costly.

**The JUNE ISSUE
will carry the full story of the
COAL SHOW.**

Watch for your copy!



Two mountains of iron ore in Venezuela—La Frontera in the foreground and Cerro Bolivar were first disclosed to U. S. Steel Corp. by a reconnaissance aerial survey

Airborne Exploration Methods

THE selection of a method or a program in mining exploration is a problem. In the solution of any problem the Army likes to prepare what it calls a "Staff Study." First, the problem is carefully defined, then the facts bearing on the problem are tabulated, then there is a thorough discussion of the facts, followed by a conclusion and finally by the recommended action in support of the conclusion.

If the geological problem, upon analysis and definition, is local and detailed, then a choice of several options is available; local experience, detailed geology, detailed geophysics, the drill, or all four intensive methods may solve it. If, however, the problem is broad and regional, or there is a likelihood that the known and recognized local problem may be only one small part of a complex whole, the aspect of the situation changes, and the use of the aircraft, the ideal tool for extensive exploration, should be considered.

Economics of the Aircraft

An employee at \$2.25 per hr can walk a mile, in reasonable country, for 75 cents. A medium, twin-engine aircraft can be hired for considerably less; a light, single-engine utility plane with a pilot can be hired for \$10-\$15 per hour, or 15 to 20 cents per mile. The question arises: "Why walk except in those areas where it is worthwhile or absolutely necessary?"

Now, in just what ways can the airplane fully assist the mining industry? By its proper use, how can an

Save Time and Manpower in Regional Exploration Problems

By F. W. HINRICHS

Fairchild Aerial Surveys, Inc.

exploration man reach stronger, sounder decisions than the preceding 15 people who have reconnoitered a certain area or envisioned a particular exploration problem?

Almost everyone in the mining and oil industries knows something about aerial photography; nobody knows all about it, but there follows a somewhat idealized step-by-step attack on an area which, by deduction or intuition, is presumed likely to contain undiscovered and valuable mineral deposits. Of course, actually finding them is a complex business. When complete or at least partial detailed geologic mapping is proposed, airborne exploration can help.

Helps in Orientation

The first and cheapest approach is the personal aerial reconnaissance inspection of the area. If it accomplishes only the most general of orientations it will be worth while. But it cannot help but do far more than that; if the area is a completely unknown one, the regional features can be envisioned in their true three-dimensional relationship, access can be planned, and a program lightly sketched out. Even if the area is pre-

viously known, the two-dimensional flatness of a geologic map or even a topographic map may never yield the sense of understanding of the geology which an aerial examination provides. Fly high for the broad effect, low for detail. Notes and photographs will permit orientation in a few hours to a degree which would take weeks on the ground. Just one flight will probably not be enough; an occasional refresher may be in order.

The second service the aircraft can perform in a regional problem is to enable a set of vertical overlapping aerial photographs to be taken of the area. Make such a set, with the customary concomitant, a photo-index map. This latter is a very small scale photograph of all of the individual photographs or prints arranged, in order, to form a rough map of the area. The prime purpose of the photo-index map is to provide the print numbers needed to be able to take a good look at some local feature. It can also be used as a rough regional map, but it has its drawbacks.

The prints themselves have a possible three-fold purpose:

(A) On them, or on enlargements, stereoscopic study and mapping can

be done. In the last five years the domestic petroleum industry has contracted for photogeologic study, mapping, and evaluation by consulting photogeologists, of an estimated 500,000 sq mi in the United States.

(B) From these prints via the negatives, a ratioed aerial mosaic using existing geodetic control only can be prepared in the laboratory. This gives a bird's-eye view at the least cost, a smooth appearing map with good edge-matches and no contrast between photos. Line drawn maps show only those features which have been surveyed in; photomaps show everything, at no extra charge. Although ideal in the early stages of an exploration program, or continuously for geologic purposes, this presentation will not pacify the engineer if he has already entered the picture, since he wants to be able to measure to hundredths of an inch. A transparent overlay, however, will serve very handily as a base on which to plot the data transferred from the individual prints.

This map should be well labelled for what it is—a corrected assembly of pictures, not an engineering map. If the economic potential of the problem area has become firmly established in short order, and the risk factor considerably lessened, it would be definitely advisable, even at this early stage, to go to the extra expense of establishing sufficient triangulation to

make possible the compilation of a truly accurate photomap (with image accuracy of the order of a few hundredths of an inch at map scale) to serve as a base for final mapping of all sorts, including geologic.

(C) From these photographs the *Radial Line Plot* can also be constructed; this is an engineering method of base map construction, particularly effective in rugged country where a mosaic is likely to encounter serious image displacement problems due to local topographic relief. The procedure is based essentially on triangulation and the fact that any image displacement in a vertical aerial photograph is along a radial line drawn from the center of the picture through the image. Without going into elaborate explanation of the process, the end result is a sheet of transparent acetate, covering the area at whatever map scale is selected, with labelled aerial triangulation points symmetrically disposed over the area concerned. These points (which represent the center points of the individual pictures and eight other points per photograph) are in effect triangulation stations, located within a few hundredths of an inch (at the map scale) of their true geodetic position. Using this network of aerial triangulation stations, any image point located on an individual photograph can be placed on a line of posi-

tion from one center point on the overlay and fixed by a second line of position obtained after transferring the image point to the next overlapping photograph in the flight line. While this may sound like a tedious process, it enables one man, working in the field without surveying instruments, but from photographs alone, to construct an accurate geologic map. Several mining companies use this method consistently.

These, then, are the normal personal and photographic aids which can be given by the aircraft in a regional exploration problem.

The fully controlled aerial mosaic, and the topographic map, compiled by stereo-contouring of aerial photographic plates, normally of course, await a point in the exploration or development phases when it becomes apparent that they will be able to pay for themselves in the saving of planning, engineering, and surveying time.

The idealized program of aerial assistance in regional mining problems, consists of the following steps:

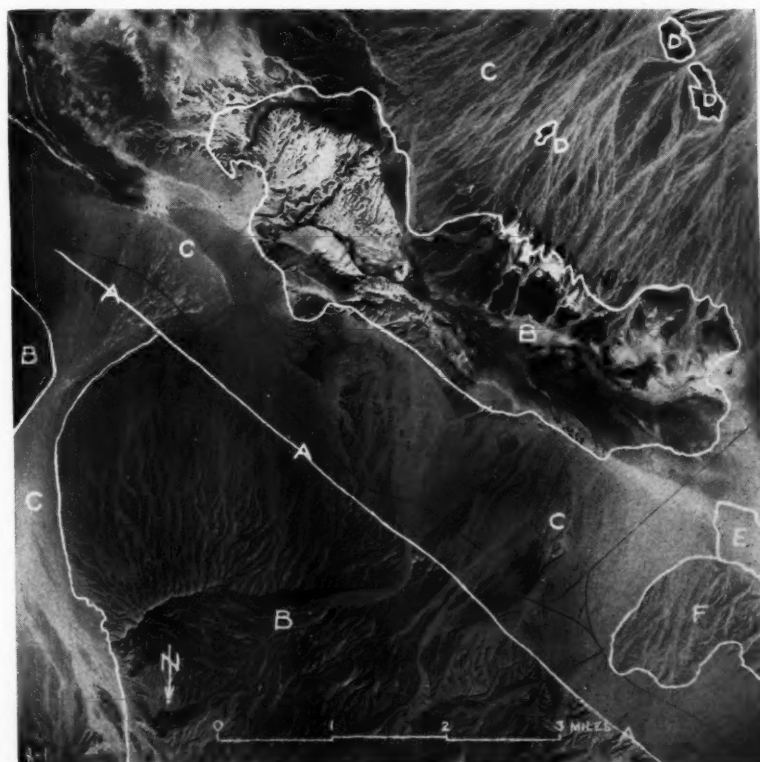
- (1) Personal aerial reconnaissance.
- (2) Office stereoscopic study of photographs; field mapping on photographs; photogeologic consultation.
- (3) Mosaics using existing control for the regional picture.
- (4) Base maps by means of the radial line plot.
- (5) Engineered base maps—fully controlled aerial mosaic and topographic.

Geophysics Takes Over

Apart from the personal and photographic assistance to exploration by the aircraft are the various airborne geophysical methods. This is where the geophysicist, who must recommend, supervise, and evaluate airborne geophysical work comes into the picture.

The consulting or staff mining geophysicist normally has considerable freedom of method choice for any specific problem. He has, in addition, other advantages: a) in most cases, with a nominal equipment cost, to which is added a short period of ground work, the applicability of the method to the problem may be generally determined and a decision reached on continuation: b) the cost of the work is principally salaries and field expenses, which are predictable, and may be budgeted and paid over a period of months, and c) most decisions can be arrived at in normal routine fashion.

When he is faced with a regional problem in which airborne methods are indicated for consideration he has to change his thinking and tempo somewhat since he will in general not be using his own equipment, but will be contracting for the use of equipment which may cost from \$10,000-\$75,000 per unit and which depre-



Death Valley, Calif. A—Fault, B—Non-marine sediments, C—Alluvium, D—Metasediments, E—Sand dunes, F—Terrace deposits

ciates rapidly. The cost of the work is perhaps one-fourth salaries, one-half aircraft and equipment operation and maintenance, one-eighth base mapping cost, and one-eighth ferrying the aircraft into the area, and economics militate against bringing in this equipment for a small area test, lengthy evaluation of the results, and undue deliberation on whether to continue, and if so where and how.

Airborne Methods Flexible

This should not be construed as any indication that airborne methods lack flexibility—the most flexible mode of transportation in the world is the helicopter. The significance is only that the survey must be extremely carefully planned, with provision for local operational control and quick decisions when necessary, after reaching a firm decision that the method selected is fundamentally applicable to the problem and is worthy of a fair trial in the area. In other words, a calculated risk must be accepted which is somewhat greater than the industry is accustomed to taking in geophysical exploration, but which is no greater than many of the risks in mining itself. Things merely happen faster, which is by no means a disadvantage.

Three Methods Accepted

Quite obviously, most recognized geophysical methods are not, nor will ever become, airworthy. Most of them require the introduction of energy directly into the earth's surface at or below the earth-air interface, or measure with delicate instruments on that interface the route of the energy, the changes in its nature, or the rates of its transmission. Several are more fortunate, in that they require only the measurement of an existing natural field (magnetic, gravitational, telluric, radiation) without the crea-

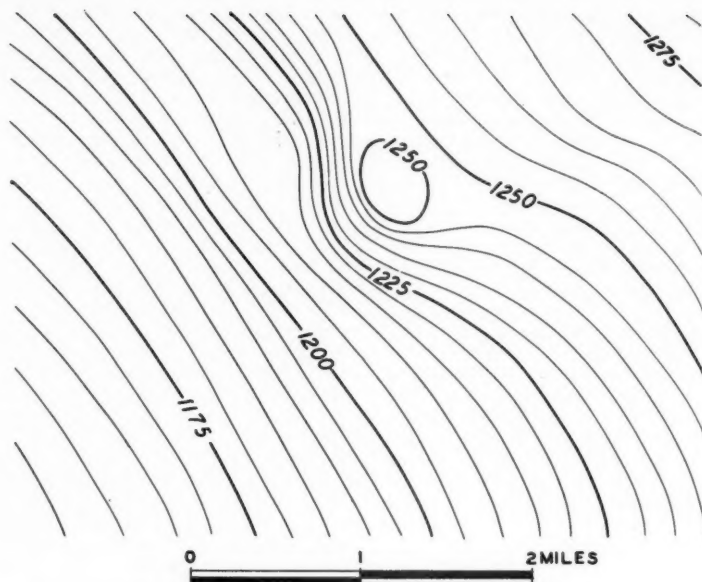
tion of artificial fields or energies.

At present, only three geophysical methods appear to be available for airborne use—the airborne magnetometer, with about a ten-year history, the airborne induction method, with a two or three-year published history, and airborne radiation detection, again with a two or three-year published history.

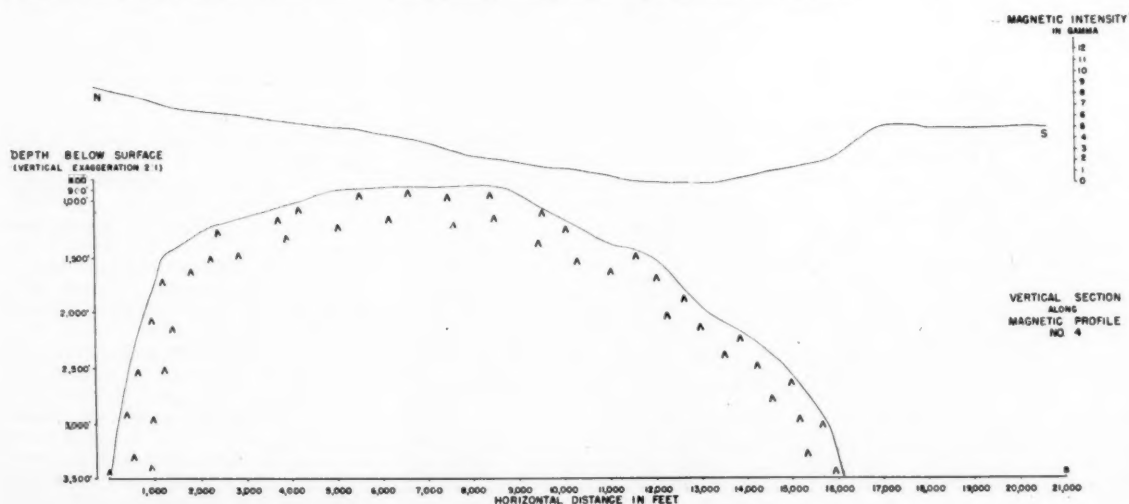
It is only natural that the airborne magnetometer is the most widely accepted and used, to the extent of far more than 1,000,000 sq mi to date. Magnetic principles are long established and familiar to both the mining and oil industries; the abilities and limitations are reasonably well understood. The advantages of speed, dependability, and freedom in the record

from misleading surface effects are recognized. The cost is a fraction of detailed ground magnetometer work (only \$6.00-7.00 per linear mile in large quantities, plus map compilation charges and base map charges if necessary). Thus the change from ground magnetics to airborne magnetics has not been difficult.

There is also available a recording instrument called the magnetic gradiometer, which is occasionally used, in conjunction with the airborne magnetometer in mining work. It is especially effective in pointing out small anomalies in those areas where the magnetic intensity is changing quite fast, as is usual, for example, over an igneous-sedimentary contact.



Aeromagnetic contour map over small igneous intrusion



Vertical section along magnetic profile of Stratton Ridge Salt Dome

Use Radiation Counters

Development work on airborne radiation detection appears to have been the direct result of the arrival of the Atomic Age and the success of the airborne magnetometer; development of the scintillation counter has assisted. Experimentation has been diversified; by the U. S. Atomic Energy Commission, for obvious reasons, by airborne geophysical companies to ascertain the commercial possibilities, by individuals to prospect for uranium and by various groups to investigate what, if any, connection exists

"When is an anomaly not an anomaly?" is a question difficult to answer, in attempting to derive all the geologic information which the radiation record contains. For mining use the instrument, of course, will pick up uranium deposits quite well.

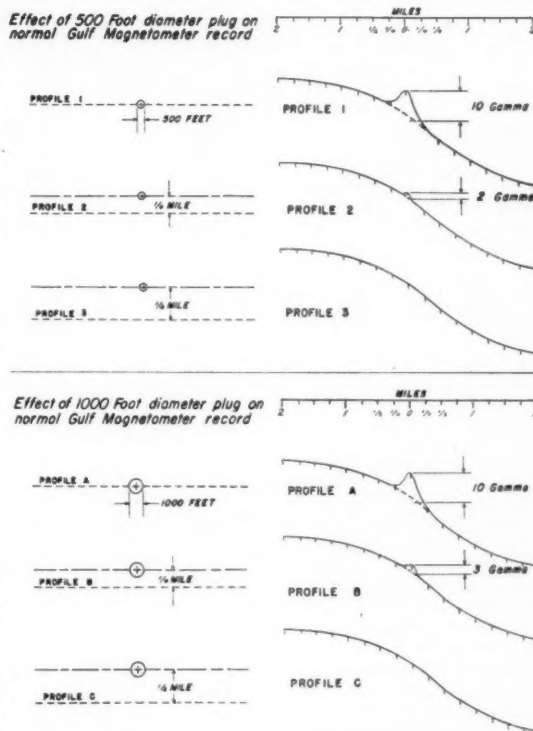
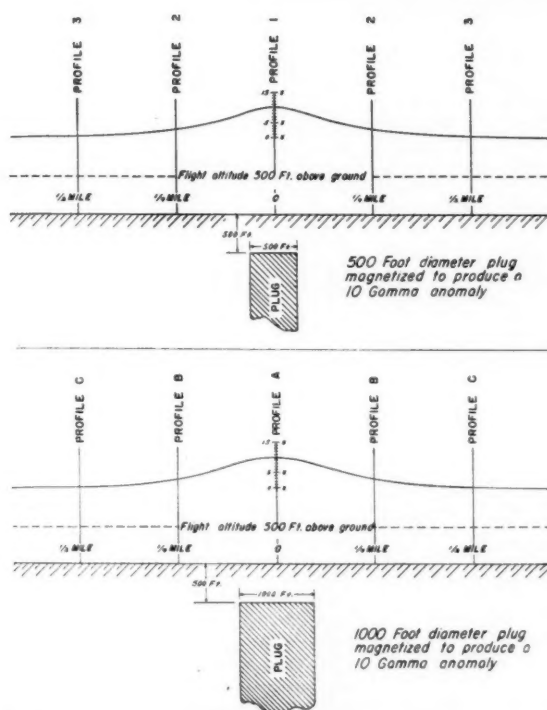
Induction Methods Tried

Airborne induction methods are in operation in Canada and elsewhere. In all fairness, the author does not know enough about the results to comment except in the most general way on the method. A medium sized

be made commercially feasible is another question. Certainly, they must be first proved to have adequate depth of penetration on the ground and to furnish some kind of worthwhile geologic information.

At present, the three methods described are available to mining exploration. The *in situ* value of iron ore, titaniferous iron ore, economic minerals associated with basic intrusions, and other orebodies directly found by the airborne magnetometer has been sufficient to repay a hundred fold the cost of all aeromagnetic mining surveys. With continuing evalua-

THEORETICAL MAGNETICS OF A PLUG



between oil fields and radiation anomalies.

Due to the modest cost of instrumentation and the low cost of flying a small plane, experimentation and development have been carried out by many organizations. This has resulted in a mass of experimental data, mostly unpublished and in many cases unscientific and difficult to evaluate. It is not enough to mount a recording instrument in an aircraft and take off over the countryside. Even with a good recording detection circuit, the determination of what constitutes an anomaly of geologic origin is frequently difficult to make. Certainly, the periodic atomic tests releasing radioactive particles into the atmosphere have not helped in the clarification of this problem.

plane appears necessary, and the physical laws involved appear to require a very low flight level in the range less than 200 ft for most effective results. This latter characteristic appears to remove the application of the method from the area of interest of the normal aerial survey business into that of the rugged individualist or crop-duster classification. The Canadian Shield provides, of course, the ideal topographic setting for airborne geophysics. Working at 11,000 ft on the side of a mountain is a far more difficult operation.

Other Methods Possible

Beyond these three methods, an active imagination may envision others; whether or not they may ever

tion of existing surveys more will be found. Published information about discoveries or significant geologic correlations by the other two newer methods is as yet too fragmental to evaluate. It is quite reasonable to predict that, with improved techniques and instruments, and better interpretational ability, many discoveries will result.

Save Time and Money

In all methods where aircraft may assist in the regional exploration program, their major role appears to be that of a time and manpower saver. Occasionally their role is the direct finding of ore, but usually they serve mainly to help the man on the ground to visualize his problems and arrive at their reasonable solution.



Cold weather and wet coal add to shipping problems

Coal Freeze Prevention for Winter Shipment

**A Report of The Surface Preparation Subcommittee,
Summarizing How The Freezing Problem is Being
Met in Several Coal Fields**

**R. A. JIMENEZ
T. W. GUY
F. X. FERNEY
J. J. MERLE
R. E. ZIMMERMAN**

FREEZE prevention of coal for winter shipment is a problem of obvious importance to those faced with the necessity of solving it. Yet it is one which up to the present time has defied what might be termed a standardized solution. Perhaps this lack of accepted standardization can be explained by realizing that it is a problem subject to widely varying requirements and conditions. It is for this reason that no attempt has been made by the subcommittee to draw rigid conclusions or make specific recommendations. Rather, the following report confines itself to a discussion of the various possible methods to prevent coal freezing in transit, and will include: (a) Mechanical Dewatering; (b) Heat Drying; (c) Methods of Car Loading; (d) Chemical Treatment; and (e) Oil Treatment. It is left to the reader to make the necessary comparisons and judgments to decide which one method or combination of methods is more economical and otherwise best suited to his particular condition and application.

Mechanical Dewatering

In a report on Indiana-Illinois operations, J. J. Merle states that mechanical dewatering is not a satisfactory freeze preventive in his field except for coal larger than 1½ in. Certainly if it is assumed that ¾ in. by 0 or ¾ in. by 0 slack would not be safe

literature, but it would be pertinent to mention briefly that the problem in centrifuging fine coal stems from a relatively small quantity of very fine particles usually present in these feeds. Data submitted by F. X. Fernel, representing typical field performances of solid-bowl centrifugal filters, illustrate the above point.

Size Range of Classified Feed Solids for Lab Tests	Fraction of Original Feed, Cum. % Weight	Percent Surface Moisture of Delivered Cake
Plus 4 Mesh X 0	100.0	18.5
Plus 4 Mesh X 10 Micron	Not Given	10.4
Plus 4 Mesh X 20 Micron	Not Given	5.1
Plus 4 Mesh X 325 Mesh	81.0	4.0
Plus 4 Mesh X 200 Mesh	79.6	3.7
Plus 4 Mesh X 100 Mesh	75.3	3.5
Plus 4 Mesh X 48 Mesh	70.5	3.1

from freezing with surface moistures of 5 percent, or even as low as 2 percent in some cases, it becomes apparent that normal mechanical centrifuging of this size range, at least at the present time, would be inadequate. The reasons for this have already been explained in detail in other

These data indicated the surface moisture of cakes delivered by this equipment varied from 5.0 percent to 18.5 percent as the amount of minus 325-mesh material varied from 2.6 percent to 19.0 percent of the feed solids. Further laboratory tests made by the manufacturer to determine the

size segment which contributed most to the moisture retained in the delivered cake, are tabulated on page 50.

The above and other similar results leave no doubt but that it is the minus 325-mesh material which retains the great bulk of the moisture found in total delivered cakes from these centrifugal dewatering units.

Enlightening as this information may be, it is of even greater interest to note that classification of filter feeds, in order to approach the moisture results indicated above, has actually been attempted for production size units. As is explained in a report on recent advances in fine coal drying submitted by F. X. Ferney, this classification has been attempted, not before the filter by screening or other means but actually within the production unit itself, by the use of a clear water "rinse" which acts to flush out the extreme moisture-retaining, high-ash fines otherwise retained in the cake. Operational experience of several companies using this method has proven that moisture in filter cakes can be reduced by 5 or 6 percent.

It is not claimed, even in the light of this new development, that fine coal can now be dewatered mechanically, on a production basis, sufficiently to prevent freezing. However, this new development does mark a significant step not only toward freeze prevention, but also toward substantial reduction in the operating cost of such subsequent treatment methods as heat drying.

Heat Drying

There seems little question but that most operating companies would agree with the statement made by J. J. Merle in a report on Indiana-Illinois operations that, as far as his company is concerned, the belief and practice is that only thermal drying is effective in reducing surface moisture to the point where shipments can safely be assumed "freeze proofed." He substantially summarizes the advantages to be thus gained by stating that his company has never had complaints on 100 percent thermally dried coal and has experienced no deleterious effects as the result of heat drying either in the production of fines, or in reduction of BTU. He further points out that thermal drying increases the as-fired BTU, and is therefore a powerful incentive to sales appeal.

It would be of interest, however, to mention that J. F. Foster and R. A. Sherman noted in a study on freeze proofing (B. C. R. Bulletin No. 7) that some trouble has been reported from freezing of shipments of coal heat-dried to low surface moisture. As this study explained, when such coal is loaded hot while the air temperature is low, the vapor pressure of

the residual moisture in the coal is high, relative to that of the atmosphere. Hence, the coal "steams" and the vapor condenses and freezes on encountering low temperatures at the sides of the car. Thus, this study found nominally "dry" coal can freeze and require further treatment during very severe weather.

Although our subcommittee is not concerned with the technical aspects of heat drying, it would be well to mention that heat drying metallurgical coals can seriously affect the coking properties of the coal if the drying temperatures are not closely controlled. This application, therefore, has been, and still is, a controversial issue. However, as evidence that drying temperatures can be controlled, N. Isenberg cites the experience of one steel company that has been using limited tonnages of heat

first filling the hoppers of the railroad cars with egg size coal, then loading the balance of the car with their normal, mechanically dewatered two-in. slack. Although such a wide variation in the size range for an individual car may not be acceptable in all cases, it seems probable that this benefit may also be obtained by "layer loading" a narrower size range. Unfortunately not enough information is available to the subcommittee to permit evaluation of the effectiveness of the latter, but the method seems promising enough to warrant further investigation.

(2) Crushing dry top size coal:

The same company has taken further precautions against coal freezing during winter transit by making provisions in its preparation plant for screening and hand pick-



Thermal drying is an effective means of freeze proofing

dried coal, of both the high and low volatile types, without any indication of over-heating or oxidation.

Definite and effective as seems the solution of heat drying to the freezing problem, final justification for the use of this method, with its attendant high cost, both capital and operating, must be based on accurate evaluation of all the conditions involved in any company's operation.

Methods of Loading

There is much that the operator can do, if not in preventing freezing altogether, at least in minimizing it to where the consequences at the point of unloading are not so serious. A few of what seem to be the major practices are briefly described below:

(1) Segregation of sizes:

A steel company mining in eastern Kentucky loading all rail has reported good success reducing unloading delays due to freezing by

ing the plus five-in. lump. This is to have available a tonnage of clean, dry coal for crushing and mixing with the final product—a mechanically dewatered two-in. slack. It is evident that if maximum benefit is to be derived from this dry coal, it must be thoroughly mixed with the wet material. For this purpose there is included in the plant design a large, twin-shaft paddle mixer capable of mixing and delivering slack coal at the rate of over 600 tph.

(3) Mixing with dry coal:

Although the following method might constitute a special case, the same producer mentioned above has been able to make arrangements within its preparation plant for including and mixing with its final mechanically dewatered two-in. slack, a substantial tonnage of dry, selectively mined coal purchased from other mines in the general area for processing through the plant. Again, in order to obtain

maximum benefit, the dry coal is thoroughly mixed with the final product by the paddle mixer. By this mixture of "foreign coal" the producer has been able to reduce the over-all surface moisture of the loaded car and thus minimize freezing without excessive variation or penalty in characteristic of the product.

(4) Winter storage of wet coal:

Although no specific examples of operators using this method have been compiled by the subcommittee in making the study, it seems logical to assume that in certain cases and under certain conditions it may be possible for a producer to stockpile the wet fine coal during the few severe winter months, without deleterious effect on the characteristics of the coal. It is not inconceivable that in certain cases, and with other conditions permitting, a producer might actually realize certain savings in freight and other costs by

against freezing while at the same time free the preparation plant from oftentimes serious and expensive problems arising out of mechanical dewatering and heat drying. Consideration is given below to the major methods of chemical treatment now in use.

1. Calcium chloride:

Reference is made to the many bulletins and papers which give detailed accounts of the use of calcium chloride for freeze prevention of coal shipments. These publications point out that the quantity of calcium chloride actually required to freeze proof a shipment of coal depends upon:

- (a) Surface moisture on the coal
- (b) The size consist of the coal
- (c) The lowest anticipated temperature to which the coal will be subjected
- (d) The amount of precipitation while the coal is in transit

The tabulation on page 53, from a

in preventing freezing by using considerably less than the quantities tabulated above. T. W. Guy cites one company in southern West Virginia that in loading a railroad car, first fills each hopper with coal and then applies calcium chloride to the coal surface over the hopper. The quantity used is increased or decreased in accordance with the expected temperature to which the coal will be subjected between loading and destination. Usually none is applied when the expected temperature is over 10° above zero.

2. Rock salt

3. Calcium-magnesium chloride brine

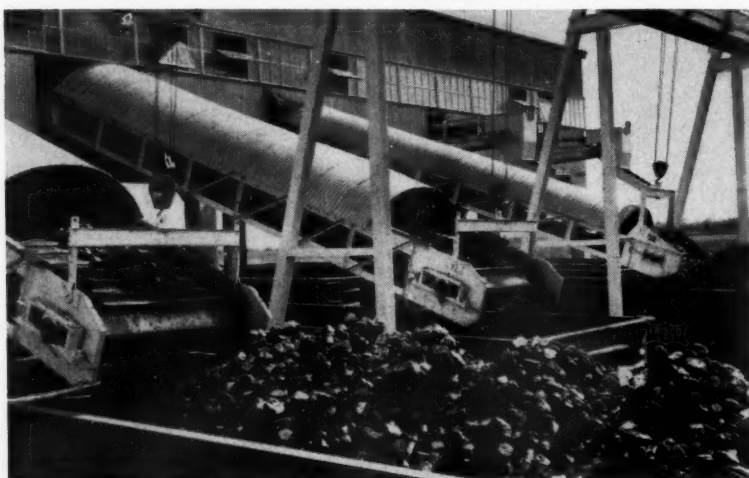
Tempting as the panacea of chemical treatment may be, there seems little doubt the use of the above salts has been limited to coals other than those designated for metallurgical uses. The reason for this is simple and uncompromising; it is the fear of chemical reaction of the salts in the coke ovens as well as fear of actual damage to the brick work. Further than that, with other type coals, J. J. Merle reported that the experience of his company indicated chemical treatment to be expensive, only partially effective, and frequently raised the incombustible in the coal.

4. Liquid diffusion compounds

These compounds seem to offer both direct and indirect benefits in accomplishing freeze prevention, and should be of particular interest to metallurgical coals producers, faced with the necessity of carefully evaluating and controlling any chemical treatment of the coal surfaces.

Concerning the direct benefits of liquid diffusion compounds, it is claimed that with these added agents, water spreads in a thin film on the coal particles rather than collecting in drops, thus enabling excess water to drain more rapidly from the coal. Sherman and Pilcher in an AIME paper present tests showing that Pennsylvania coal soaked in water, drained the same degree in ¼ minute with the wetting agent as it did in three hours without the agent.

D. W. Gilmore and C. C. Wright in a recent report on drainage behavior and water retention properties of fine coal, found that the addition of a wetting agent does not materially change the initial drainage rates of a coal where most of the drainable water is removed and where the moisture distribution pattern is being established. However, they found that wetting agents do lower the moisture retention of the fine coal and do increase the rate at which the lower equilibrium moisture values are approached in addition to lowering the height of the high-moisture region in the draining coal. The authors point out also that in some cases considerable adsorption of the wetting agent by the coal was noted and could there-



Proper loading can minimize freezing

shipping his high moisture fines during more advantageous seasons.

(5) Snow removal:

No discussion of the various techniques to minimize coal freezing would be complete without stressing the importance of removing snow from railroad cars to be loaded. As J. J. Merle points out, it is not difficult to imagine the consequences of loading coal into several feet of snow.

Chemical Treatment

It is to the credit of the coal industry that much of the investigation and study of the problem of freeze prevention has been along the lines of chemical treatment of the coal surfaces. Certainly, it must seem attractive to the producer to have a relatively inexpensive chemical compound which would protect coal shipments

bulletin of the Calcium Chloride Institute shows the quantities of calcium chloride recommended for freeze proofing coal shipments.

A reference to an AIME paper (February, 1952) "Freezeproofing Coal with Calcium Chloride," submitted by R. E. Zimmerman, further explains the application of calcium chloride. This paper suggests the use of flake if the coal contains enough surface moisture to cause drainage from the cars after loading. Quantities recommended are as shown in the table; as the proportion of fine coal sizes increase, larger amounts of calcium chloride are to be used. If there is no drainage from the coal, a calcium chloride solution is recommended—a 32 percent concentration or 4½ lb per gallon.

It should be noted, however, that some operators have had good success

POUNDS FLAKE CALCIUM CHLORIDE PER TON OF COAL

Temperature Degrees F.	3% Surface Moisture	6% Surface Moisture	9% Surface Moisture
+32 to +15.....	3.0 to 4.5	6.0 to 9.0	9.0 to 13.5
+15 to 0.....	4.5 to 6.0	9.0 to 12.0	13.5 to 18.5
0 to -15.....	6.0 to 7.5	12.0 to 15.0	18.0 to 22.5

by impose a serious limitation on the use of such agents for lowering surface tension in coal slurries. Actual experience of one large producer, as reported by R. E. Zimmerman, confirms this theory for they found the use of a wetting agent hastens drainage of coal and by lowering moisture reduces the tendency toward freezing.

An interesting method of application of these compounds of direct benefit in freezing prevention would be their use to aid dewatering over vibrating screens or even in centrifugals. Although the subcommittee has been unable to obtain operating data, the method seems promising enough to merit further investigation.

In addition to the above, a large manufacturer claims another important advantage arising out of the use of their wetting agent. It is reported that tests conducted for this manufacturer by the Armour Institute of Technology indicate clearly that the use of two gallons of their wetting agent solution (1:1000 water solution) gives a bulk density equal to treatment with three gal of Bunker C oil.

Oil Treatment

It is interesting to note that an oil refining company, as reported by J. L. Stewart, explains that the treatment of the coal surfaces with oil at the time of loading reduces freezing by faster dewatering. In a paper presented before AIME in October, 1952, in which J. L. Stewart describes the use of oil in treating coal from many general angles and discusses the problems encountered in its application, he points out that its use for aiding dewatering are of great importance. He states that with the affinity of oil for coal surfaces in preference to water, coal with oiled surfaces will drain off water much faster than untreated coal, claiming a car of stoker will drain to a minimum moisture in six hours when oil treated in comparison to 24 hours for an untreated car of the same type coal and initial moisture. Based on the above, it is the feeling of this company that oil freezeproofing can be accomplished so that coal can be handled under all conditions whether unloading hoppers or moving winter stockpiles. It goes without saying that the above would be subject to the proper choice of viscosity, treatment dosage, and method of application of the oil.

Another explanation of why oil

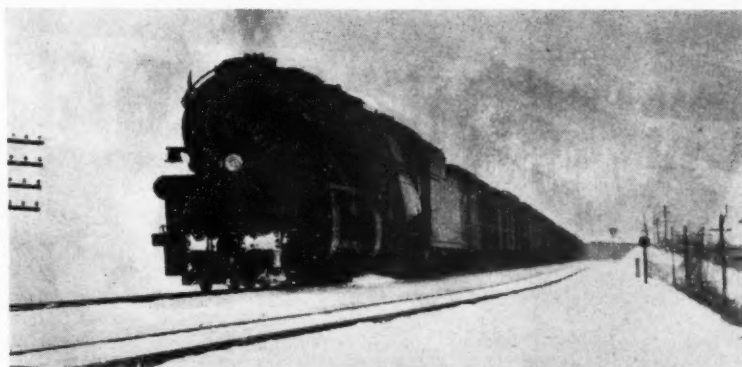
treatment at the time of loading is a freeze preventive is offered by another oil company. Their experiments seem to show that a film of oil properly distributed over the coal surfaces prevents solidification of the coal in the cars by acting as a cleavage which helps break down the solid mass of coal into smaller lumps when being unloaded.

Reference is made to the detailed information in the literature concerning types of oils, treatment dosages and methods of application, as published by commercial oil companies. One such company advises using a quantity of oil for freezeproofing in

faster than undried coal due to the removal of the natural oil film from the coal surfaces, and such coal should be treated with oil to re-coat these surfaces.

Notwithstanding the above, the experience of operating companies seems to be quite varied. J. J. Merle reports that oil treatment for their Illinois coal is completely ineffective as a freeze preventive although it is used extensively for dedusting. A steel company mining in eastern Kentucky reports that adding one quart of oil per ton of two-in. slack as it was loaded into the cars at the washery did not improve the ease of unloading enough to warrant the expenditure. On the other hand, R. E. Zimmerman reports that another steel company having operations in West Virginia finds oil treating helps greatly to reduce unloading delays.

No discussion of oil treatment would be complete without making reference to the use of oil diffusion compounds to supplement normal practice. A



Conditions en route will also help determine the method of treatment

direct ratio to the percent of slack in the whole, recommending a treatment dosage of from two to six quarts per ton on eastern coals, and considerably more oil of higher viscosity on central coals. This same company has concluded, from careful evaluation of many case histories, that it is not only more economical to oil treat the slack size separately but also the resultant blend will have a better appearance and sales appeal. It has also been concluded that in those cases where nominally "dry" slack is blended with the washed product, it may be beneficial to oil-treat this dry slack to make it water-repellent prior to blending with the wet coal. The advantage here would be that the "dry," oil-treated, water repellent portions would not freeze into a solid mass, thus materially aiding unloading even if the wet portions do freeze.

Concerning the application of oil treatment to heat-dried coals, it is of interest to note that, in the reference above, J. L. Stewart states that thermally dried coal will pick up moisture

manufacturer of this compound states that it functions to cause the oil to flow faster over the external surface areas, visibly pushing the excess moisture from the coal, and finally resulting in a thinner oil film and better penetration. Based on this functioning, it is claimed that its use will substantially reduce the quantity of oil necessary to treat a car of coal, thereby reducing the net cost of oil treatment.

Conclusion

Within the limitations of time and space, the subcommittee has attempted to impartially bring together some of the more important information now available concerning freeze prevention, realizing that the subject is at best controversial. The subcommittee wishes to recognize the several technico-scientific investigations now in progress which have the promise of contributing substantially to the basic understanding of the freezing problem and to the development of improved methods for its control.

CMI

CENTRIFUGAL COAL DRYERS...

FOR DRYING COAL

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CENTRIFUGAL & MECHANICAL INDUSTRIES

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How To Use A Carbon Arc Burner in Battery Repair

LEAD burning is becoming increasingly important in battery maintenance programs as industry becomes more alert to the economic advantage of more careful treatment of the primary energy sources which drive so many lift trucks, tractors, shuttle-cars and other industrial vehicles. Lead burning (welding) may be done with an acetylene and oxygen torch or with a carbon burning outfit. The latter uses electrical power from the battery being repaired and involves but the simplest of equipment. The following instructions and precautions are volunteered by Gould-National Batteries.

The carbon burner consists only of an electrode holder and a carbon rod. It is designed for six volts (three cells of a battery) as its power supply. It is a common error to use the

carbon burner on either fewer or more cells, the former being inadequate for making a good weld, the latter actually endangering battery, operator and joint.

The burning tool may be connected either directly to the battery being worked upon or to three cells of an adjacent battery (if the unit under repair is entirely discharged).

The rod is pointed to a $\frac{1}{8}$ -in. tip and is permitted to extend from the holder to a length of about $1\frac{1}{2}$ in. When possible, it should be connected to its power source so that the carbon rod is of negative polarity. This makes welding easier as it tends to keep the joint and the working surface clean. Lead surfaces to be welded must be clean. A wire brush may be used for this purpose after the surfaces have been neutralized.



Here a connector is being burned to a post—fresh lead being applied to the rod so that it flows down into the puddle, and damp rags being used to protect adjacent parts

The inside hole of a connector may be cleaned with a knife. The tip of the carbon should be wire-brushed before starting. Dark glasses are recommended.

Keep Materials Clean

Secret of making a good joint is to have clean materials and a hot carbon. The technique calls for thoroughly heating the center of the part being worked until a puddle of molten metal exists. Only then may additional lead be added. Work rapidly to complete the operation before the entire part melts. When possible use a damp rag to surround the part being worked on. When building up posts or splicing a connector, use molds made for the purpose.

After making a burn, allow the joint to cool undisturbed. In cooling the lead will shrink slightly. Do not move or disturb the joint during cooling; this may cause the lead to crystallize and result in a poor joint.

When working within a mold, it is necessary that the carbon not be permitted to touch the side of the mold.

To determine whether a weld has been properly made, it is wise to test with a pair of pliers (after the joint was cooled) to see if the joint will strongly resist separation. If separation occurs, examine the two surfaces to determine the points and nature of weakness so that the situation can be corrected on the second try.

When adding new lead to a joint, touch the new lead to the carbon rod and let it flow down into the puddle rather than to plunge cold lead into the puddle itself.

In burning a connector to a post, one slow trip around the post should be sufficient to make a satisfactory weld. Although the same is true of burning a post to the lead-insert of a new cover, the depth of the joint is such that considerable lead will have been removed from the post in the single slow circuit around the joint. Therefore, the carbon point should be returned to the center of the post and new lead added to raise the post height up to the level of the top of the post mold.



Wheels of GOVERNMENT



As Viewed by **HARRY L. MOFFETT** of the American Mining Congress

FOLLOWING a brief Easter recess Congress has speeded up the tempo of its legislative activity with an eye on an early July adjournment date. Its attention is being focused on submerged lands measures, extension of the Reciprocal Trade Agreements Act, appropriations to run the Government in the next fiscal year, amendment of the Taft-Hartley Act, reorganization of executive agencies and departments, economic controls, problems of the domestic mining industry, relationships of Federal and State governments, and possible tax reduction.

Peace balloons, floated by Russia and other Iron Curtain countries, are being viewed by the Administration with a wary eye. Many officials in high office consider the Russian move an attempt to lull the West to the point that it will cut back its defense activities. However, military leaders are continuing their drive to build up the defenses of the United States and her Allies. Sharp cuts in military appropriations are not expected this year.

Controls Bill Reported

The Senate Banking Committee has approved a measure giving the President "standby" authority until June 30, 1955, to freeze wages, prices and rents for 90 days, in case of emergency.

In reporting a revised Defense Production Act, the Committee restricted the power of the President to allocate materials for general distribution in the civilian market to cases where he finds that they are essential to national defense or where national defense needs for them cannot be met without dislocating civilian supply.

Of interest to the mining industry are proposed amendments of the existing Defense Production Act to extend the term for long-term Government contracts for scarce materials for one year, from 1962 to 1963, and to provide that any materials acquired by the Government under long term contracts which are not needed to carry

out defense programs must be transferred to the National stockpile. The latter amendment further provides that stockpile appropriations are not to be charged for the cost of acquisition of such materials, but that the Treasury must cancel notes of the Defense Materials Procurement Agency equal in amount to the cost of the materials transferred to the stockpile. The Committee bill would also broaden the definition of "small business" to expressly include producers of strategic minerals and metals, whose businesses are independently owned and operated and are not dominant in their field of operation. This action makes strategic minerals producers eligible for RFC loans for plant construction, expansion, acquisition of land, or to finance the acquisition of equipment and supplies.

The bill is expected to receive early floor consideration.

ODM Revamped

Economic controls received attention on another front, when President Eisenhower sent Congress a reorganization plan calling for a revamping of the Office of Defense Mobilization and establishing it on a permanent basis. In addition to its duties under the Defense Production Act, ODM would also assume the functions of the National Security Resources Board, which would be abolished, and the stockpiling functions of the Munitions Board.

The President told Congress that the policy and program aspects of stockpiling are an integral part of mobilization planning, and that a transfer of these functions from the Munitions Board to ODM would do much to correct "present undesirable confusion of responsibilities." The plan also calls for the Defense and Interior Departments to cooperate with ODM in determining which materials are strategic and critical and the quantities to be purchased, but the ODM Director would have final authority over any such determinations.

★ ★ ★ ★ ★ ★ ★ ★

Washington Highlights

ECONOMIC CONTROLS: Before Senate.

DEFENSE MOBILIZATION: Agencies re-shuffled.

LABOR LAW: Revisions being drafted.

RECIPROCAL TRADE: Strong act sought.

METAL MINE INSPECTION: Federalized?

★ ★ ★ ★ ★ ★ ★ ★

Arthur Flemming, who has been acting head of ODM, has now been named Director of Mobilization by the President and confirmed by the Senate.

T-H Amendments Being Drafted

Extensive hearings before the House Education and Labor Committee on revision of the Taft-Hartley Act have concluded and similar hearings before the Senate Labor Committee are in their final stage. Staff members of both committees are working together on the drafting of amendments to the law and hope to come up with their proposed changes in the near future.

During the past month a steady stream of witnesses has appeared before both committees and their testimony has ranged from proposals of minor changes in language to a major overhauling of the Act. Labor witnesses continued to call for virtual repeal of the Act while industry witnesses urged its strengthening. Both committees evidenced particular interest in testimony dealing with injunctions, national emergency strikes, industry-wide bargaining, administration of the Act by NLRB, secondary boycotts, mass picketing, and Communism within labor unions.

During the course of the Senate Committee hearings, Joseph E. Moody, president of the Southern Coal Pro-

ducers' Association, declared that the Taft-Hartley Act "has been the victim of reluctant administration" and that no major changes should be made until it has been administered in "a friendly manner." He said that if any changes are made they should be in the direction of strengthening the Act and not weakening it. He called for restoration to the States of their traditional power in the field of labor relations and for a Congressional survey of existing private welfare and pension plans. Following such a survey, he said, the appropriate Congressional Committees should recommend such legislation as may be necessary to assure adequate regulation and control of existing and future welfare and pension funds.

Trade Act Changes Sought

Extension of the Reciprocal Trade Agreements Act for a one-year period from June 12, 1953, together with strengthening amendments designed to provide some protection for the domestic lead and zinc, coal and petroleum industries is being sought under the terms of a measure introduced in the House by Rep. Simpson (Rep., Pa.). Hearings on his measure opened before the House Ways and Means Committee on April 22.

The Simpson proposal would tighten up the administration of the Act by requiring the President to carry out the recommendations of the Tariff Commission as to "peril points" for domestic commodities; and would make it mandatory that the President invoke the "escape clause" upon a finding by the Tariff Commission that domestic workers or producers are being damaged or threatened with damage through the operation of a trade pact.

The measure provides for the placing of a quota limitation on the total quantity of crude petroleum and petroleum products that could be imported in any quarter equal to 10 per cent of the domestic demand for the corresponding quarter of the previous year. It would also limit the total imports of residual fuel oil for any quarter to 5 per cent of the domestic demand for such oil in the corresponding quarter of the previous year; and this amendment to the Act is being solidly backed by the American Mining Congress, the coal industry, independent petroleum producers, and railway and mine labor.

Before the Simpson bill carrying the restrictions on residual fuel oil was introduced, some 22 other measures on this subject had been tossed into the House legislative hopper. Sponsors of these measures had strongly urged House support, pointing out that foreign residual oil is closing mines, driving the labor force from coal communities, and harming the national defense effort. They told the House that the coal equivalent of the 600 million

barrels of residual oil imported since 1946 exceeds 150 million tons, which means a wage loss for domestic coal miners of more than a third of a billion dollars as well as heavy losses to employees of coal-hauling railroads.

For lead and zinc, the bill provides a sliding scale stabilization import tax pegged to a base price for each metal of 15½ cents per pound. The base price would be adjusted at quarterly intervals in line with the Bureau of Labor Statistics index of primary market prices for commodities other than farm and food.

In the case of lead and zinc metal, whenever the market price of either metal fell below the base price, the proposed tax would be 1 cent, plus 1 cent per pound for each 1 cent the market price is below the base price (with fractions in proportion). The amount of the tax also would be adjusted quarterly, based on the average market quotation for the second preceding month. The same tax would be applied to lead and zinc pigments. For ores and concentrates the tax would be on a similar sliding scale, at the rate of 7/10 cent per pound for lead content and 9/10 cent per pound for zinc content.

This import tax would be enacted as permanent legislation, and would not be subject to modification or suspension through any foreign trade agreement or other means.

Three measures providing for sliding-scale duties on lead and zinc imports, identical to those called for in the Simpson bill have been introduced in Congress, highlighting the plight of these two branches of the mining industry. In the Senate, Senator Henry Dworshak (Rep., Idaho) has tossed the bill into the hopper while over in the House, Reps. Dawson and Stringfellow, both Republicans of Utah, have introduced the bill.

All is not smooth sailing for changes to the Trade Agreements Act. President Eisenhower has announced that he favors a simple one-year extension

of the present law, while House Speaker Martin not only echoed this view but called upon members of his party to abandon attempts to revise the law. The plight of domestic industries, harmed by a flood of foreign imports, must be made known throughout the length and breadth of the land if adequate protection is to be secured this year.

Federal Metal Mine Inspection Proposed

Federal safety inspection of metallic and nonmetallic mines and quarries would be authorized in a bill introduced jointly in the Senate by Senators Murray (Dem., Mont.) and Humphrey (Dem., Minn.). Reportedly fostered by the CIO Steelworkers, the measure would extend to the rest of the mining industry some of the safety inspection provisions now governing the coal mining industry. It would not provide Federal inspectors with the power to close down mines.

The bill would empower the U. S. Bureau of Mines to make annual or necessary inspections in metallic and nonmetallic mines and quarries to obtain information relating to health and safety conditions and the causes of accidents and occupational diseases, and based on its findings, to recommend legislation to Congress. It calls for strong penalties for failure to admit inspectors to mines or quarries and would provide for the promulgation of a safety code for these mines and quarries.

The American Mining Congress has registered a vigorous protest to leaders on Capitol Hill against this measure, pointing out that effective mine safety laws covering metal and non-metallic mines and quarries are in existence in the States and are being carefully enforced. It is reported that the Bureau of Mines itself believes the excellent safety record that has been established belies the need for any Federal activity in this field.

Big Nickel Deposit

(Continued from page 33)

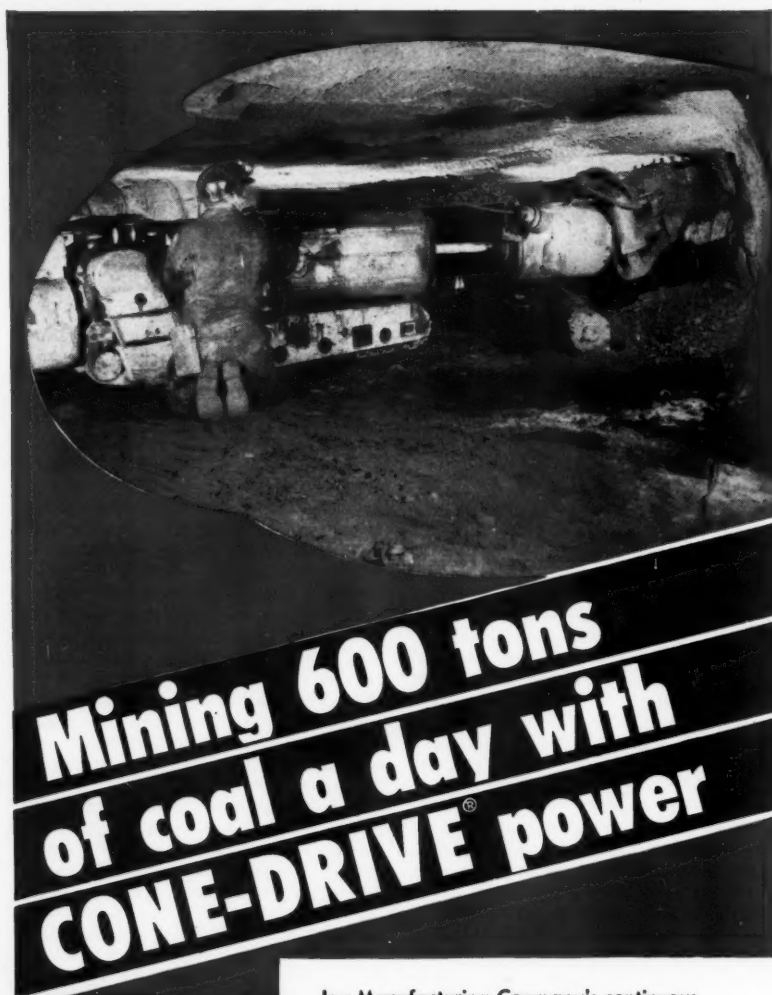
torily demonstrated. Freeport will now build a pilot plant to obtain the engineering information for the design of a commercial plant to treat the Moa Bay ores, and will pursue actively its plans for the construction of such a plant. It will probably be a number of years before such an undertaking can make significant contribution to the company's distributable earnings.

Freeport has been studying the nickel business since 1939 and has spent substantial sums in examining nickel deposits in many parts of the world as well as on research to deter-

mine the best processes for the treatment of nickel ores.

Moa Bay offers the best opportunity the company has found for developing a substantial source of nickel capable of surviving in world competition and of assuring to the United States a continuing supply of this vital metal.

Freeport, the second largest producer of sulphur in the world, has for many years been active in the field of winning and processing raw materials. One of its subsidiaries, Cuban Mining Co., devised a process to use previously undeveloped Cuban manganese ores and supplied important amounts of this critically needed material to American industry during World War II.



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Joy Manufacturing Company's continuous mining machines can dig up to 600 tons of coal in two shifts and load it into shuttle cars.

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Five Cone-Drive worm gear sets per machine were specified by Joy engineers to meet these requirements.

The 65-hp. main drive for the cutter head has two 7-in. center distance, 5/1 gear sets. Three 3.577-in. C.D., 6/1 ratio gear sets drive the conveyors.

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Recommend Revision Of Taft-Hartley Act

(Continued from page 29)

Section 8(d), to prohibit strikes over proposals to modify the provisions of a fixed-period labor contract until the expiration of the 60-day notice, or until the expiration date or anniversary of such contract, "whichever occurs later." In fact, that is precisely what Congress said.

It is high time that quasi-judicial legislation was brought to a halt. Apparently it can only be done by spelling out in language, which even unreasonable men cannot distort, precisely what the Congress means.

We submit that where a labor agreement for a fixed period covers the basic matters of wages and hours of employment and provides a procedure for the final and binding disposition of disputes as to its interpretation and application, there is no longer any reason why a no-strike obligation should not be legally implied.

Conclusion

In conclusion we would like to make a few brief observations. It will be said, no doubt, that the views of the American Mining Congress, as expressed by us, are too extreme, too militant. It will be said that they are the views of "super-reactionaries," or of "union busters." We deny these statements.

The American Mining Congress recognizes the need in our modern industrial system for strong, democratic labor unions. It recognizes the need for the preservation and implementation of the right of workers to strike under lawful circumstances and for lawful objectives. The industry recognizes, however, its fundamental obligation to the nation—the obligation to attain maximum production with maximum efficiency. It is our sincere belief that the defects of the present laws, which we have just discussed, are serious obstacles to the fulfillment of that obligation.

The tremendous power placed in the hands of the labor bosses, coupled with governmental partisanship and governmental interference, can, unless curbed, sap the productive strength of American industry. As we see it, therefore, our duty is to press vigorously for the elimination of these abuses and to be militant in the face of militancy.

If we and other spokesmen and representatives of a free nation fail to carry out that duty, control of our national economy will pass, by default, to the labor bosses. When that happens, free enterprise, along with free unions, will pass into limbo.



Personals

J. B. Haffner, vice-president and general manager of the Bunker Hill and Sullivan Mining & Concentrating



Co., was recently elected president of the Lead Industries Association. Haffner succeeds Felix Wormser who severed connections with the association after 25 years of service to accept an appointment by President Eisenhower to become Assistant Secretary of the Interior for Mineral Resources. Other officials elected at the 25th annual meeting of the organization held at White Sulphur Springs, W. Va., are: **K. C. Brownell**, vice-president; **J. A. Martino**, vice-president and **J. M. Bowlby**, vice-president.

Recent changes in the Coal Division engineering staff of Eastern Gas and Fuel Associates, have resulted in new assignments for four resident engineers. **F. W. Riddle**, formerly resident engineer at Wharton No. 2 mine, has been appointed assistant resident engineer at Federal No. 1 mine. **J. B. Links, Jr.**, resident engineer at Carswell mine, succeeds Riddle at Wharton No. 2. **R. R. Snyder**, formerly resident engineer at Wharton No. 1, has been transferred to Carswell, replacing Link. **R. H. Freeman**, resident engineer at Powellton No. 3 mine, succeeds Snyder as resident engineer at Wharton No. 1.

Harry C. Webb has been named executive vice-president and director of Pan American Sulphur Co. Prior to his new assignment, Webb was director of public relations for Texas Gulf Sulphur Co.

Alan S. Evans, Jr., has been named manager of the coal chemicals division of Pittsburgh Coke & Chemical Co. In his new post Evans will be responsible for all the company's activities in the coal chemicals field, including the duties formerly discharged by **F. D. Schreiber**, who died March 22.

Julian D. Conover, executive vice-president of the American Mining Congress, was awarded a citation for

distinguished professional services by the College of Engineering of the University of Wisconsin at an Engineering Convocation in Madison, Wis. He addressed the Convocation on "New Horizons for Mineral Resources," advocating a national policy of maintaining a healthy domestic mining industry and encouraging the development of new metal and mineral reserves.

The other guest speaker on this occasion was **Arthur C. Nielsen**, Chicago, president of the industrial marketing research organization bearing his name, who spoke on "The Engineer and Distribution." University President **E. B. Fred** presented distinguished service awards to **Conover**, **Nielsen**, and four other leading industrialists and engineers.

Allen H. Englehardt has been promoted to vice-president of the Cerro de Pasco Corp. He will continue in charge of the company's operations in Peru.

R. E. Salvati, president of Island Creek Coal Co. and Pond Creek Pocahontas Co., has announced the retirement of **H. L. Smith**, financial vice-president of both companies, after almost 44 years of service. Smith will be succeeded by **R. W. Laxson**, who was named a vice-president.

Smith was formerly comptroller of the two companies. At the same time **Salvati** announced that **John J. Foster**, who has been serving as assistant to the president in charge of industrial and public relations, was also elected a vice-president.

Louis Ware, president of International Minerals & Chemical Corp., announced that effective July 1, **R. B. Fuller** who is presently manager of the Florida Phosphate Department of the corporation, will be promoted to the position of assistant to the vice-president in charge of the Phosphate Division. Fuller will work on special assignments and will be directly responsible to **George W. Moyers**, vice-president in charge of the division.

Also effective July 1, **F. B. Bowen**, who is presently manager of the Tennessee Phosphate Department, will become manager of the Florida Phosphate Department and assume the responsibilities relinquished by Fuller. Bowen will be specifically responsible

for all of the activities of this department, which include rock and chemical phosphate.

Appointments made by Governor **C. J. Rogers** of Wyoming immediately following the adjournment of the Wyoming legislature included that of **Lyman Fearn**, of Rock Springs, for a term of two years as coal mine inspector; and the following examiners for coal mine inspectors: **Stanley Laya**, of Monarch; **Edwin Swanson**, of Superior, and **Robert F. Bowie**, Rock Springs, all for two years.

Henry Mulryan succeeded to the presidency of the Sierra Talc & Clay Co., effective February 9. Before his promotion, Mulryan was executive vice-president and general manager of the company.

Election of **J. T. Ryan, Jr.**, as president of Mine Safety Appliances Co. was announced April 20 by the directors of the company. He succeeds **George H. Deike, Sr.**, who was named to the post of chairman of the board.



J. T. Ryan, Jr.



Geo. H. Deike, Sr.

Ryan is the son of the man who, with **Deike**, founded the concern in 1914. He was graduated from Pennsylvania State College in 1934 and received an M.B.A. at Harvard. **Ryan** began his business career as a sales engineer with the company in 1936. In 1948 he was elected to the board of directors and named executive vice-president.

He is president of the Callery Chemical Co., a director of MSA subsidiaries abroad, of **Thomas A. Edison, Inc.**, **Townsend Co.**, **Ruud Mfg. Co.** and **Thorofare Markets, Inc.**

Ryan recently received the 1953 Duquesne University Management Award for "leadership in management," presented by the Duquesne Chapter, Society for the Advancement of Management.

Deike received his B.S. degree in Mining Engineering at Pennsylvania State College in 1903 and, in 1948, was awarded a graduate degree of Engineer of Mines by the college. He had been president of Mine Safety Appliances Co. since the firm was founded nearly 39 years ago.

President and director of the Carbon Monoxide Eliminator Corp. and the Catalyst Research Corp., **Deike** is also president of the Pennsylvania Research Corp., a director of **Follansbee**

Steel Corp., and vice-president, board of trustees, of The Pennsylvania State College.

Bituminous Coal Research, Inc. has made known the appointment of **Paul O. Kock** to the Columbus staff of that organization. He has been assigned to research and development on projects relating to industrial heat and power.

The appointment of **Frederick C. Green**, former Utah Copper millman as assistant general manager, Utah Copper Division, Kennecott Copper Corp., is announced by J. P. Caulfield, general manager of the company's Western Mining Divisions effective April 1, 1953.

The new assistant general manager started as a flotation operator at Utah Copper Company's Magna mill in 1924.

In 1939 Green became mill superintendent at Hurley, N. M. for the present Chino Mines Division of Kennecott. He was named general superintendent of the reduction plant at Chino in 1946, general superintendent of that division in 1947 and assistant general manager a year later.

Oscar T. Solberg, since 1934 sales manager of the Knife River Coal Mining Co., at Bismarck, S. D., has been named a vice-president of the company. The Knife River Coal Mining Co. is a subsidiary of the Montana-Dakota Utilities Co. and has headquarters in Bismarck, but operates mines at Beulah and Gascoyne.

Richard H. Willey, general hill foreman at the Bingham mine of the Utah Copper Division, Kennecott Copper Corp., has resigned to become general superintendent of the Philippine Iron Mines, Inc., of Luzon, P. I., an open-pit mine which was worked before World War II. **Albert Kastelic** succeeds Willey as general hill foreman.

M. S. Hall has been appointed coal freight agent of the Baltimore and Ohio Railroad at Cincinnati, according to an announcement by **George C. Bauer**, coal traffic manager.

The appointment of **Dr. R. Genders** of London, England, as metallurgical consultant to Vanadium Corp. of America was announced by **William C. Keeley**, president. Dr. Genders is deputy director of Metallurgical Research at the Royal Ordnance Factory, Woolwich, which deals with metallurgical problems of Britain's Army, Navy and Air Force.

Dr. Glen L. Parker, a consulting economist who for the past two years has served with the U. S. National Production Authority, has joined the survey team of **Robert R. Nathan Associates** in Korea. Dr. Parker has been program executive for coal mining equipment with the NPA, which he has served since August 1951.

C. DeWitt Smith, superintendent of mines for the St. Joseph Lead Co. at Gouverneur, N. Y., since 1950, has been promoted to the company's main offices in New York City. **Maynard Hurley**, mine captain at the Edwards mine, will become superintendent, succeeding Smith. **C. William Hawn**, formerly associated with the company operations in Argentina and Canada, succeeds Edwards as mine captain.

William McGregor, formerly chief electrician at the Western Kentucky properties of Bell & Zoller Coal Co., has been promoted to general superintendent of the properties. **William Robinson** has replaced McGregor as chief electrician.

Phil Shenon has been elected a director of Day Mines, Inc., to succeed **Paul B. Jessup**, who recently resigned to join Kennecott Copper Corp.

Shenon, a Salt Lake City consulting

geologist, formerly was dean of the University of Idaho school of mines. He has been a consulting geologist for Day Mines since 1946.

Gov. **Sigurd Anderson** of South Dakota has named **John Treweek** of Lead to be state mine inspector. He succeeds **M. Clair Smith**. Treweek has been safety officer at the Homestake in Lead. His term is for two years.

Richard L. Bowditch has been elected president of the Chamber of Commerce of the United States. Bowditch is a seacoast New Englander who earned his first money as a trapper boy in a Logan county, W. Va., coal mine 30 years ago and has since risen to the presidency of C. H. Sprague and Son Co. He has served the Chamber as a director for the past five years in the fields of U. S.-Canada relations, foreign commerce, transportation, communications and natural resources.

— Obituaries —

George E. Nettels, 59, vice-president and member of the Board of Directors of the Pittsburg and Mid-



way Coal Mining Co., Pittsburg, Kans., succumbed to a heart attack March 20, 1953.

The coal executive was widely known throughout the coal mining industry, having been engaged in coal mining operations since 1922. He served as president of the Southwestern Coal Operators' Association in 1950-51 and was a member of the Kansas Professional Engineers and the Land Use Committee of the National Coal Association.

Mr. Nettels was a graduate of the University of Kansas and was an active member of the University Alumni Association. He was captain of the 1920 University football team.

McKinley W. Kriegh, one-time member of the American Mining Congress staff, died in Washington, D. C., on April 8. Mr. Kriegh headed the Tax Division of AMC during the late 1920's. He entered private practice in Washington on July 1, 1930, when he left the organization.

Rudolf Nagel, chief engineer of the Heavy Materials Handling Division of Heyl & Patterson, Inc., died in Pittsburgh recently following a short illness. He was 63 years old.

Mr. Nagel had been chief engineer of Heyl & Patterson for the past eight years and an employee of the com-

pany since 1916. He was known as an authority in his field and was active in the development of many advancements and improvements in Heavy Bulk Materials Handling Equipment.

Lawrence B. Harrison, 72, who for 40 years was general manager of the American Smelting & Refining Co. operation in Mexico, died in La Jolla, Calif., in late March.

Owen Meredith Fox, for 18 years manager of the Advertising Department of the Cleveland-Cliffs Iron Co., died on April 1.

Mr. Fox was born in Goddard, Kans., and before joining Cleveland-Cliffs in September, 1935, had resided in Chicago. He was an organizer and first president of the Chicago Coal Merchants' Association and had been editor of *Black Diamond*.

B. F. Frost, discoverer of one of the first lead mines in the Carthage, Mo., area, and a former Texas Ranger, died at the age of 100 in Sheridan, Wyo., March 8.

Arthur B. Campbell, former Idaho mine inspector, died in Boise, Idaho, in late March. Mr. Campbell served as state mine inspector, an elected position in Idaho, from 1934 until 1946.

Norman Hickman, vice-president of the American Metal Co., Ltd., died March 9. He was 62. Mr. Hickman became assistant treasurer of American Metal Co. in March, 1929, assistant secretary in March, 1935, and a director in January, 1937. He was appointed manager of sales in March, 1937, and was elected a vice-president in July, 1952.

NEWS

and VIEWS



Eastern and Central States



Mine Inspectors Meet

The 43rd annual convention of the Mine Inspectors' Institute of America will be held at Birmingham, Ala., on June 8 and 9. Headquarters for the convention will be the Thomas Jefferson Hotel and those who plan to attend are urged to make hotel reservations as early as possible.

AC Needed Underground

The trend toward increased mechanization of mining operations and the increased demand for electricity may force a turning to alternating current electrical equipment and a revision of state laws regulating permissible voltages, the Southern District Meeting of the American Institute of Electrical Engineers was told at a meeting in Louisville, Ky.

Both ac and dc distribution systems have their limitations in mining applications and these "are further magnified by laws limiting utilization voltage maximums," J. Z. Linsenmeyer and A. G. Owen, of Westinghouse Electric Corp., East Pittsburgh, Pa., observed in a technical paper entitled "AC vs. DC Power for Underground Mines."

"But the trend toward increased mechanization and the demand for electric power at points remote from the power source may gradually force a turning to ac powered equipment and a revision of mining laws to permit utilization voltages which are

best suited to the needs of the industry, as well as the safety of the equipment operating personnel," they said.

In 18 states with a published code, they said, seven limited voltage at the mine face to 300 v, eight made no mention of voltage and three allowed voltages over 300 v under certain circumstances.

Application of electrical power to underground mining machinery, particularly in underground coal mining, is a highly specialized problem, "requiring more rigid restrictions of installation than any other industry," the two engineers said.

P & R Allers Organization

A consolidation of its purchasing department activities and the transfer of all such activities to its Pottsville offices was announced by the Philadelphia & Reading Coal & Iron Co., effective May 1.

Edward G. Fox, president of the company, who made the announcement, said that John A. Dwyer, of Philadelphia, purchasing agent of the company for many years, will head the new set-up with the title of director of purchases. John P. Buckley, of St. Clair, presently supervisor of materials and transportation, will become purchasing agent. Their office will be located in the P and R Building at 200 Mahantongo Street, Pottsville, Pa.

The new department will have authority over all purchases of the P. & R. Co., and its subsidiary companies: Shen-Penn Production Co., Wadesville Production Co., Berks Building Block Corp., Butler Township Water Co., and Reading Anthracite Canadian Co., Ltd.

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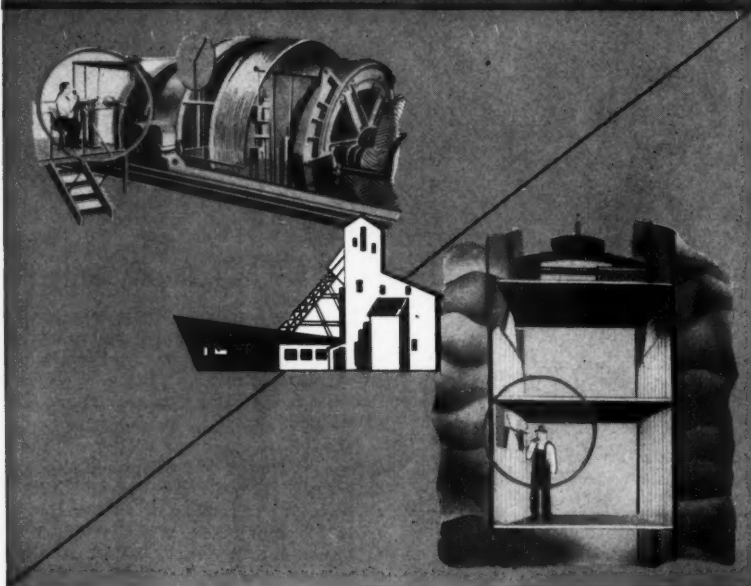
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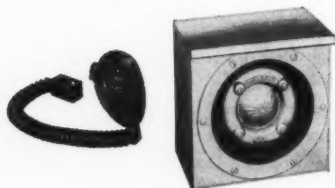
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Win Safety Award

The Indiana Coal Operators Association has awarded its Templeton Trophy for safety to the Ingle Coal Corp., operator of the Ditney Hill mine near Elberfeld, Ind. This is the second straight year that the award has been made to Ingle Coal Corp. The trophy, originated by the Indiana Coal Operators Association in 1936 and dedicated to John A. Templeton, pioneer in the mining industry, is awarded each year to the mine in the association with the best safety record. Approximately 300 persons are employed at the southern Indiana slope mine.

Inland Leases Canadian Iron Ore

Inland Steel Co. has joined the movement to Canada for iron ore to supplement dwindling domestic reserves. It was recently announced that a Canadian subsidiary of Inland, Caland Ore Co., Ltd., has leased one of the several iron ore bodies owned by Steep Rock Iron Mines Ltd. in Steep Rock Lake, Ont. Test drillings to date indicate at least 50,000,000 tons of ore in the leased area with a greater tonnage possible. It is expected to take about seven years to develop the new ore body. At full production Inland expects to attain a shipment volume of 3,000,000 tons of ore annually.

The lease marked Inland's first entry into Canada, although the company has been participating in exploring ore deposits in Canada for more than 20 years.

Drilling and exploring have continued on the leased area throughout the winter. The major undertaking of bringing the Caland mine into operation will be started as soon as possible.

The project will be developed under A. J. Cayia, manager, of the company's iron mines and quarries since 1946. Cayia has been made vice-president and general manager of Caland Ore Co. and has been given complete responsibility for developing the Steep Rock property.

Increase Grinding Capacity

Construction on new feldspar grinding facilities at Erwin, Tenn., which will increase capacity for finely ground F-4 pottery grade flotation feldspar by about 50 percent, has been announced by Norman J. Dunbeck, vice-president in charge of the Industrial Minerals Division of International Minerals & Chemical Corp.

At the same time Dunbeck announced that a new mica mill also has been put into production at Erwin. The mill, which will supply a growing market for finely ground mica in the rubber and paint industry, will be operated under the Newdale Mica Co., a unit in the Industrial Minerals Division's Consolidated Feldspar Department.

Use 42-In. Bolts in 31-In. Seam



After an 18-in. hole is drilled through the boney, the main top is drilled for bolting

MINE officials of the Barnes and Tucker Coal Co., Mine No. 20, Cambria Co., Pa., have devised an ingenious system to bolt the roof and, at the same time, pave the way to removal of the boney coal, that lies immediately under the roof in a layer 18 to 22 in. thick, at a later date. This method of roof supporting calls for

both timbering and bolting. In operation the boney coal is drilled out of the roof in a cylindrical shape using a Kennametal HCTS-9 $\frac{1}{4}$ -in. bit, and then using the same drill and Kennametal HFD 1 $\frac{3}{4}$ -in. bits, bolt holes are drilled in the center of the cylindrical-shaped hole and 42-in. bolts installed. The only remaining step in a com-

pleted installation is the timbering up of the boney coal. A feature of this operation is that 42 in. bolts are easily installed by this method in their 31-in. coal. To remove the boney coal all they plan on doing is to drill five to six-ft blast holes at about eight-ft centers and bring it down in a series of benches.

Pitt. Consol's Coal Production

According to the annual report of the Pittsburgh Consolidation Coal Co., during 1952 production from company mines and mines under supervision of the company totaled 26,344,000 tons. This compares with 28,169,000 tons in 1951. The 1951 production amounted to approximately 5.27 percent of the nation's output of bituminous coal. Using preliminary figures for the 1952 production of bituminous coal, Pittsburgh Consolidation produced 5.66 percent of the total output in 1952.

Is Germanium Out?

Scientists at Battelle Memorial Institute, Columbus, Ohio, report the development of a low-cost material that may compete with germanium and silicon for use in transistors, rectifiers, and other electronic devices.

The potential competitor is a compound of aluminum and antimony. It is one of several that may come from compounds of aluminum, gallium, and indium with arsenic and antimony. Rectifiers have already been produced in the laboratory with the new "semi-conductor material" and its use in the making of transistors is a distinct possibility, according to Dr. A. E. Middleton, of Battelle Institute.

Studies sponsored at the Battelle research center by the Bradley Mining Co., San Francisco, Calif., have shown that aluminum-antimony has electrical properties "at least as interesting as those of germanium and silicon." Furthermore, the new semi-conductor material may be superior to germa-

nium, and perhaps silicon, for military uses where operation at high temperatures is required.

Aluminum-antimony is likewise at-

tractive, costwise, Middleton said. Both components currently sell at less than 50 cents a pound. Germanium sells for about \$350 a pound.



Patent Applied For

"Better Safety Records" With PATTIN'S New Double Expansion Roof Bolt Shell-

Comparative torque meter tests in a number of mines have proved the new PATTIN expansion shell unequalled in anchorage strength resulting in a reduction of frequency and severity of roof falls. A safer roof means fewer accidents, increased production, more clearance for equipment operation and better ventilation.

For a safer roof—use the new PATTIN shell that has double the usual shell expansion plus a 3-inch parallel contact with the hole wall providing the strongest kind of anchorage. No definite drilling depth is required as the shell can be anchored solidly any place in the hole and will not turn while being tightened. With wedge and shell being locked together there's no loss of parts in handling and no special nuts or ears are needed on the bolts.

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Could Cut Anthracite \$5 a Ton

Coal prices could be reduced by as much as five dollars a ton, according to Glenn O. Kidd, vice-president of Lehigh Navigation Coal Co., one of the largest anthracite producers.

The way to do this is by the formation of a single company to produce the entire output of the industry, Kidd said in a talk delivered before 250 retailer-members of the New Jersey Coal Dealers Association at Newark.

Highlights of the cost-reducing plan, as announced by Kidd, are:

(1) All anthracite companies would transfer their mines to the newly formed company, which would then be the only producer. This company would be capitalized by the issuance of 1,000,000 shares of no-par value stock, to be distributed among the present producing firms. Four divisional presidents, two from the northern anthracite field, and two from the southern field, would head the active management.

(2) The company, by operating only the most efficient and low-cost mines, and producing enough coal to meet the market demand, would effect large savings by eliminating idle day costs like ventilation of underground workings, pumping, safety inspec-

tions, and the like. Dropping of these standby expenses on days when the mines do not work would make possible economies of as much as \$75,000,000 a year, which figures to five dollars in the price per ton of household sizes of anthracite.

(3) An advisory committee of representative retail dealers would be named to work with the new company.

(4) The United Mine Workers union and the Commonwealth of Pennsylvania would designate advisory committees to work with the new company.

Kidd said a special call for legislation on the part of the United States Congress would be sought, as part of official authorization for the consolidation plan. "We'll need the support and cooperation of existing governmental agencies," he said. "All the quality anthracite in the United States is produced within a relatively small geographical area of Pennsylvania, so that the organization of production facilities should be quickly and conveniently accomplished."

"We sincerely believe this plan is the keynote of an effective long-term program for the industry. It is designed to help everybody associated with the industry, from the miner to the consumer," Kidd concluded.

Red Face Department

Two typographical errors crept into the article "Maximum Extraction in First Mining," by Mack Shumate which appeared in our March issue.

On page 34 a reference was made to the Central Washington Plant at Ceredo, W. Va. This, of course, should have been the Central *Washing* Plant. In the table on page 37, tons per face-man was listed as 35.8 percent. The word *percent* should not be there.

First Jamaica Bauxite

The first shipload of bauxite destined for the Corpus Christi, Tex., plant of the Reynolds Metals Co., was delivered by the S. S. *Carl Schmedeman* on March 29. Carrying 12,900 tons, the *Schmedeman* takes four days for the trip from Jamaica to Corpus Christi and unloads in less than ten hours.

New Mines Building

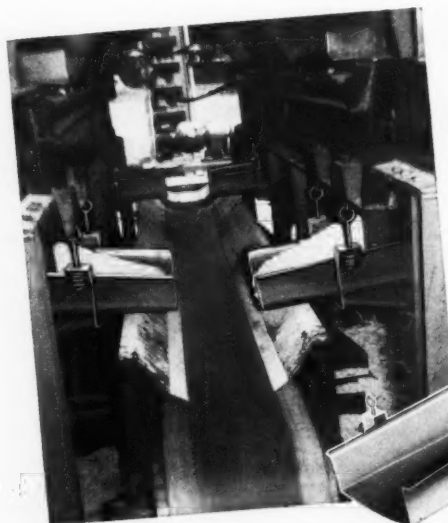
A new six-story \$1,000,000 building will be built this summer at the University of Pittsburgh to house the Schools of Engineering and Mines. To be built on the upper Pitt campus at Oakland, Pa., the building will contain classrooms, laboratories and offices for the two departments. Among special laboratory equipment to be transferred to the new building will be the hydraulics laboratory, strength of materials laboratory and several research laboratories.

Extend Tioga Mine Lease

The Western Mining Co. recently obtained a lease extension on the Tioga No. 1 and Tioga No. 2 iron ore properties from the State of Minnesota. The Western Mining Co., whose operations are managed by Pickands Mather & Co., is also operating the West Hill Mine between Grand Rapids and Coleraine.

The Tioga properties are located in the vicinity of Pokegama Lake near Grand Rapids, Minn. The original lease was made in 1906 for a 50-year period. After extended negotiations, a lease extension to December 31, 1974, has now been granted by the State of Minnesota. The properties are low grade, and the greater part of the product must be concentrated. Pokegama Lake presents a water hazard to the development of the property and transportation difficulties must be solved. There are other iron ore properties in the area which are controlled by the M. A. Hanna Co.

The new property will be called "The Tioga Mine." Preliminary work has been started by the Western Mining Co. at the mine.

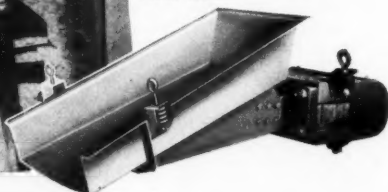


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Western States

Sunrise Shaft Deepened

The Sunrise shaft of the Highland-Surprise Consolidated Mining Co., near Kellogg, Idaho, has been sunk an additional 450 feet and a station cut. Work was carried approximately to the 1950 level. Plans are to open the 1660 and 1940 levels.

Grandview Mechanized

One hundred percent "Gismo" mechanization has been attained in the Grandview mine at Metaline Falls, Wash., with the installation of a second diesel-powered "Gismo" system on a single shift basis. The "Gismo" is a combination mucking machine, shuttle car and drilling jumbo, which was invented by Dale I. Hayes, western manager for American Zinc, Lead & Smelting Co., operator of the Grandview mine for Grandview Mines, Inc.

One of the new Gismo assemblies, already in two-shift operation at Grandview, has enabled management to raise 70 percent of the total ore production from 14 tons per man-shift to more than 103 tons per man-shift in the stope excavation process delivered to the central rail transportation system.

Central City Mill

Plans are being laid for the construction and equipping of a 50-ton selective flotation gravity feed mill in Prosser Gulch, near Central City, Colo. The mill will handle ores on a custom basis. It will be the first mill of its type ever opened in Gilpin County for treatment of custom ore, according to V. R. McKay, president of the United Mining and Leasing Corp., which has guaranteed to provide the new mill with thirty tons of ore daily. The enterprise has been launched by Central City businessmen and the Central City Milling and Mining Corp. formed to build and operate the plant.

The United people have blocked out enough ore to be able to meet their agreement for ore deliveries for more than a year without further exploration. McKay predicted that the custom mill will make it possible to reopen many old diggings in the Central City and Blackhawk gold and silver

mining districts. It is especially expected to provide a market for small shipments of a few tons at a time. Many small operators have announced that they have stockpiles of ore ready for delivery.

Union Accepts Wage Drop

Miners at United States Smelting Refining & Mining Co.'s property at Bayard, N. M., have agreed to a 20 percent wage cut in order to prevent a probable shutdown under present low lead and zinc prices.

The announcement was made by the Grant County Miners Association, which represents the workers. The new wage scale for miners is \$1.40 an hour, compared to \$1.75 before.

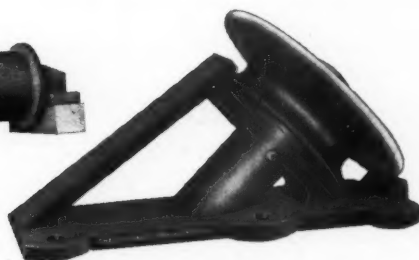
Coal Co. Drills For Oil

According to Henry R. Platt, Jr., vice-president and treasurer of Truax-Traer Coal Co., the company has executed a lease to drill for oil on approximately one-third (1080 acres) of its Burke County, N. D., holdings known as the Kincaid Mine near Columbus, N. D. It is expected that a test well will be drilled this spring.

This is the first and only venture in oil and gas exploration on any of the company's holdings in North Dakota and no other developments are planned at this time, according to Platt. The nearest producing oil well is more than 20 miles from the contemplated site and the management of the company makes no prediction as to the outcome of this venture, classifying it purely as a "wild-cat" test.

Homestake Wins Award

The Homestake Mining Co. of Lead won one of the three top awards of the "Keep South Dakota Green" Association. Don Howe of the company received the award. Homestake contributed money to the "Keep Green" program and had a float which toured the Black Hills reminding of forest fire dangers.



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Old Timers Make Award

On March 23, 1953, The Old Timers Club awarded a gold watch to Merlynn O. Anderson, selected by the faculty of the University of Utah as the out-



standing senior in mining engineering. The presentation on behalf of the club was made by Dr. L. E. Young.

Anderson worked in coal mines in Utah, served in the United States Army, and began his mining education at Carbon College, completing his course at the University of Utah under a cooperative plan existing between the college and the university.

B. P. Manley, executive secretary, Utah Coal Operators Association, presided at the luncheon in the College Union, where the award was made. Dr. A. E. Jones, president of Carbon College; Dean C. J. Christensen; and other members of the faculty of the university, were present.

Gypsum Production Readied

Northwest Gypsum Co. expects to start production soon at its property near Weiser, Idaho, reports Earl L. McEuen, president, at the company's office in Colfax, Idaho. A tramway across the Snake River to the Union Pacific Railroad right of way is near completion and bunkers are being built. On completion of the bunkers, the company expects to go into full-scale production.

Tests have shown the deposit to be of high quality, with 91.5 percent gypsum and 2.8 percent insoluble silica. Sulphur content of the gypsum is over 17 percent.

New Park Installs Hoist

New Park Mining Co. has completed installation of its large underground hoist. The hoist serves two compartments of the three-compartment Mayflower shaft in the Park City, Utah, district. The old hoist will be used to move men and materials in the third compartment.

Installation of the double-drummed Nordberg hoist, driven by 350-hp mo-

tor, will double the lift capacity of the mine. Main purpose of the addition was to provide for exploitation of ore reserves below the 1500-ft level. The new hoist has a capacity of 21,500 lb down to 3000 ft, and its rope speed is 1000 fpm.

Big Week For El Paso

October 28, 29, 30 and 31 have been designated International Mining Days for 1953 in El Paso, Tex. The New Mexico Mining Association annual convention and the AIME regional fall meeting are to be held in El Paso at the same time. The three mining groups will hold one joint convention.

Alaska Chrome Operation

The government has announced that development of the Red Mountain chrome deposit on the Kenai Peninsula in Alaska is to be undertaken under a contract with Kenai Chrome Co., of Anchorage. The contract calls for production of 13,000 long tons of chromite from a deposit about 12 miles inland from Kasitsna Bay. The ore would be hauled to the bay by truck and shipped by barge from there to Tacoma or Seattle, Wash.

Operations are to start this summer and the contract runs to the end of 1955.


URGENT. Need a two drum shaft hoist, 300 hp or larger. Also, a 200 hp or larger single drum hoist. Box No. 808.

CF&I Ups Coke Production


A new coal washery installed by the Colorado Fuel & Iron Corp. at its Pueblo, Colo., coke plant has raised coke production by 16 percent, according to A. F. Franz, president of Colorado Fuel & Iron.

The new cleaning plant was installed in six months without a single day's shutdown of operations. It is now cleaning up to 3400 tons per shift. With the increased supply of washed coal now available, the coke ovens can turn out 3350 tons of coke a day to feed the blast furnaces of Colorado Fuel & Iron's fully integrated steel mills at Pueblo as well as coke for outside sale.

Colorado Fuel & Iron, which ranks ninth in size from the standpoint of rated ingot capacity, supplies its Pueblo plant with slack coal from mines in Colorado, New Mexico and Arkansas.



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THE COLORADO FUEL AND IRON CORPORATION, DENVER AND NEW YORK



FORGED STEEL GRINDING BALLS
THE COLORADO FUEL AND IRON CORPORATION

1134

Storke Producing

Production has started from the Storke level of the Climax Molybdenum coal mine at Climax, Colo. On February 23, the Storke operations went on a continuous operating basis with mining and crushing shifts working around the clock.

Chrome Mining Active

The extent to which chrome mining has replaced gold mining in Oregon is shown in a directory of active Oregon mines issued by the Oregon state department of geology and mineral industries. The directory lists 48 chrome mines and 13 chrome concentrating plants, as compared with two gold lode mines and 12 seasonal gold placer operations.

Five mercury mines were active in Oregon last year, the report reveals, and one manganese mine, one copper-cobalt property, one nickel development and one black sand property.

Ray Open-Pit Busy

The open-pit at the Ray Mines Division, Kennecott Copper Corp., Ray, Ariz., is supplying approximately 85 percent of the total tonnage mined. The remaining 15 percent comes from underground operations. Development of the Ray pit was started in 1948 with stripping and initial mining operations contracted to the Isbell Construction Co. Since April of 1952, however, all of the pit work has been handled by the Kennecott organization. Total ore production from the Ray Mines Division in 1952 was 5,040,052 tons, of which 4,329,763 tons came from the pit and 710,289 tons from underground. Copper production is estimated at 49,135 tons. During the year 10,009,927 tons of waste were removed from the pit. At the end of the year, Kennecott's payroll totaled 1027, with 763 employees at the mine at Ray and 264 employed at the concentrator at Hayden.

Exploration at Idaho Birthday

Idaho Birthday Mines Co. recently awarded a contract for the driving of 450 ft of exploratory tunnel at the company's property near Lowman, Idaho. Objective of the tunnel is a gold vein encountered in a diamond drill hole recently completed.

N. D. Research Foundation

The North Dakota Research Foundation will have Dr. Alex C. Burr as full-time director. He has resigned as chief of the Bureau of Mines, Region V fuels technology division. Dr. Burr has been director of the foundation since 1942. His headquarters will remain in Jamestown, N. D., with the foundation's headquarters at Bismarck, N. D.

1953 Metal and Nonmetallic Mineral Mining Convention

Nationwide Committee Appointed to Draft Program for Seattle Meeting

PHILIP R. BRADLEY, JR., president, Pacific Mining Co. and National Program Committee Chairman for the American Mining Congress Meeting in Seattle, September 21-24, has announced the appointment of 17 State and District Program Committee Chairmen.

These men and hundreds of others have been asked to suggest topics and speakers. Chairman Bradley has called for a meeting of the State and District Chairmen in Seattle in mid-June. There, they will sift the suggestions and formulate a program covering national mineral policies, tariffs, taxation, labor relations, public land laws and other matters of government policy, as well as improvements in mine and mill operating practices and equipment.

Out of this meeting will evolve a program designed to answer the questions uppermost in the minds of mining men all over the country. Attendance at the convention in Seattle



Philip R. Bradley, Jr.

will be especially heavy. It is advisable therefore to make hotel reservations at the earliest possible date. All requests for reservations should be sent to the Seattle Hotel Association, 315 Seneca St., Seattle, Wash.

Program Committee Chairmen

Alaska: J. D. CRAWFORD, Vice-Pres. & Gen. Mgr. of Alaskan Operations, U. S. Smelting Refining & Mining Co.

Arizona: L. M. BARKER, Mgr., Phelps Dodge Corp.

Colorado: HARRISON S. COBB, Franklin Mine; President, Colorado Mining Association.

Idaho: E. B. DOUGLAS, Mgr., Blackbird Div., Calera Mining Co.

Montana: KUNO DOERR, JR., Mgr., East Helena Plant, American Smelting & Refining Co.

Nevada: NORMAN E. HANSON, Exec. Asst. to Mgr. of Operations, Western Div., Basic Refractories, Inc.

New Mexico: W. P. MORRIS, Resident Mgr., Duval Sulphur & Potash Co.; President, New Mexico Mining Association.

Oregon: A. O. BARTELL, Managing Engr., Raw Materials Survey.

South Dakota: A. H. SHOEMAKER, Gen. Mgr., Homestake Mining Co.

Texas: J. C. ARCHIBALD, JR., Mgr., Texas Mining & Smelting Div., National Lead Co.

Utah: CECIL FITCH, JR., Vice-Pres. and Gen. Mgr., Chief Consolidated Mining Co.

Washington: FRANK N. MARR, Pres., Spokane-Idaho Mining Co.; President, Northwest Mining Association.

Wyoming: C. A. ROMANO, Resident Mgr., Intermountain Chemical Co.

Mississippi Valley: ELMER ISERN, Vice-Pres. & Gen. Mgr., Eagle-Picher Co.

Lake Superior: WALTER A. STERLING, Vice-Pres., Cleveland-Cliffs Iron Co.

Eastern States: FRANK R. MILLIKEN, Vice-Pres., Kennecott Copper Corp.

Manufacturers of Mining Equipment: JOHN P. COURTRIGHT, Pres., Marion Power Shovel Co.; Chairman of the Manufacturers Division of the American Mining Congress.

AIME Meets

WITH a total attendance of some 2600 mining and petroleum engineers and their ladies, the 175th general meeting of the American Institute of Mining and Metallurgical Engineers was held in Los Angeles in February. An almost bewildering program of technical sessions and social events kept those who attended on the go all during the convention.

Host to the visiting engineers was the Southern California section with arrangements under the general direction of Henry T. Mudd. Among the notables who addressed the various groups were Governor Dan Thornton of Colorado, and Lewis W. Douglas, chairman of the board of the Mutual Life Insurance Co. of New York and former ambassador to the United Kingdom.

At the Annual Banquet the following Medals and Honors were presented: the Charles F. Rand medal to Eugene Holman, president, Standard Oil Co. (New Jersey); the Anthony F. Lucas Award to Morris Muskat, assistant to the vice president of production, Gulf Oil Corp.; the Rossiter W. Raymond Memorial Award to A. N. Holden, research associate, Knolls Atomic Power Laboratory, General



New AIME President Andrew Fletcher (second from left), talks things over with three of his predecessors: L. E. Young, W. M. Peirce and M. L. Haider

Electric Co.; the Robert H. Richards Award to Edward W. Engelmann, assistant general manager, Utah Copper Div., Kennecott Copper Corp.; the Robert W. Hunt Award to John H. Chesters, assistant director of research, United States Steel Co., Ltd., England; Mathewson Gold Medals to Paul A. Beck, research professor, University of Notre Dame, P. R. Sperry, research metallurgist, Kaiser Aluminum and Chemical Corp. and Hsun Hu, Institute for the study of metals, Uni-

versity of Chicago, and the J. E. Johnson, Jr., Award to Charles M. Squaracy, assistant superintendent of blast furnaces, Inland Steel Co.

M. L. Haider, deputy coordinator of production, Standard Oil Co. (New Jersey) presented his successor as president of the AIME, Andrew Fletcher, president, St. Joseph Lead Co., who pledged himself to uphold the example set by his predecessors and to continue to further the aims and objectives of the Institute.

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Tracks Cleaned at a Profit

Today, track cleaning is not a costly headache . . . it is a pleasant, profitable operation. No track workers to get hurt. Clean tracks once thoroughly with the Canton Track Cleaner. Then subsequent cleanings yield good coal, load cars higher, haul more tonnage. Reclaim spillage mechanically. Write us for name of nearest mine where you can make inspection.

Performance Records . . .

893 three-ton cars, on time and one-half, were loaded with machine at a cost of \$.462 per ton. Hand loading (estimating five 3-ton cars per man per shift) would cost \$1.31 per ton. Total cost at \$19.575 per shift for 893 cars with machines—\$1237.70. Same number of cars, hand loading, would cost—\$3509.49. Would the saving of \$2271.79 have any effect on your cost per ton of coal? Another company loaded 887 tons at a cost of \$.465 per ton cleaning 27,860 ft. of track at \$.015 per foot. (Names on request.)

Write for complete data. Please use street and zone numbers.

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Mechanical Track Cleaners • Automatic Doors • Distributors • Car Transfers • Automatic Switch Throws

Write us what your track cleaning costs are and how many miles of track you clean, and we will show you how much extra profit you can make with a "Canton" Track Cleaner, after it has paid for itself.

Anaconda Sulphur Mine Working

Anaconda Copper Mining Co. has begun stripping overburden from its open-pit sulphur mine in Alpine County, Calif. The mine is expected to produce about 600 tons daily of sulphur ore when it goes into production in the latter part of the current year. Entire output of the mine will be sent to Anaconda's copper recovery project at Yerington, Nev., to be used in making sulphuric acid.

Improve Sampling Practices

Announcement has been made by Sheldon P. Wimpfen, manager of the Grand Junction Operations Office of the Division of Raw Materials, U. S. Atomic Energy Commission, of the progress made to improve uranium ore sampling procedures. During recent years, as uranium production has increased, there have been many advances made toward betterment of sampling procedures to provide representative pulps that would not slant sampling results either in favor of the ore buyer or the ore producer and would at the same time improve efficiency and economy.

Changes in sampling procedures reported by the Climax Uranium Co., Grand Junction, Colo., include making



Henry Mulryan, right, president of Sierra Talc and Clay Co., past director of the Los Angeles Chamber of Commerce and ex-chairman of the civic organization's mining committee, was recently honored by fellow committee members for six years of service to the mining industry and the community. Plaque expressing appreciation is presented by Peter Colefax, mining committee chairman, as E. O. Slater, past chairman of the group, looks on. Award was made at recent meeting of the mining committee in the board of directors' room at the Chamber. Peter Colefax is president, American Potash and Chemical Corp., and E. O. Slater is president, Smith-Emery Co.

a 10 percent primary cut of the lots of ore. This step has been completed and was placed in effect about March 1, 1953. Also, where a bucket elevator is used by Climax to elevate ore, the corners of the bucket elevator boot have been filled in to facilitate cleaning of the boot in preparing the sampling plant to receive a fresh lot of ore.

The U. S. Vanadium Co. reports that it now has in operation at its Rifle, Colo., plant a primary sample cutter so arranged as to take a 20 percent sample at regular intervals. A Vezin sampler is in use to take a secondary cut of 10 percent. The use of coffee mills and Jones splitters is confined to the sample-preparation department.

At the Uravan, Colo., plant of U. S. Vanadium Co., it is reported that the chain bucket elevator has been eliminated as a sample cutter and a 60-in. Snyder primary sampler cutter installed.

At the Thompsons, Utah, plant the U. S. Vanadium Co. reports that the design and layout drawings for the installation of 18 by 24-in. rolls and installation of ore feeders and Vezin samplers has been completed. The use of a cross-flight chain and bucket sampler is contemplated in place of the chain and bucket elevator sampler. Also, conveyors will be enlarged to eliminate spillage. It is expected that the Thompsons installation will be completed by mid-summer.

The Vanadium Corp. of America, Durango, Colo., advises that primary crushing has been altered to give a minus ½-in. product. The conveyor from the primary crusher has been extended and the cross-flight conveyor

removed and replaced with a 30-in. Snyder sampler to give 20 percent cuts of the primary crusher discharge. A conveyor carries the cut to a newly installed 8 by 10-in. secondary crusher set to give a minus ¾-in. product. A 20-in. Snyder sampler follows the secondary crusher to provide a 10 percent cut. This portion of the sample is directed to an 8 by 8-in. crusher which provides a minus ¾-in. product which is fed to a newly installed 20-in. Snyder sampler that provides a 10 percent cut. A cone crusher reduces the split to ¾-in. size and the sample is then manually split to an appropriate size for transfer to sample preparation facilities.

The AEC is continuing extensive testing of the accuracy of the sampling and analytical determinations made by the various ore purchasing stations to assure that ore producers are being paid accurate prices for ore shipments.

Idaho Mining Meet

In the summer of 1903, the then Governor of Idaho, Frank B. Gooding, requested that Idaho's mining men gather together to furnish a display of minerals for the scheduled international exposition in St. Louis in 1904. This was the motivating force behind the organization of the Idaho Mining Association in Boise.

From July 13-16, this group of mining men will celebrate their Golden Jubilee at Sun Valley, Idaho. Those planning to attend the 50th year meeting should get in touch with Harry W. Marsh, Secretary, Idaho Mining Association, 304 Continental Bank Bldg., Boise, Idaho.

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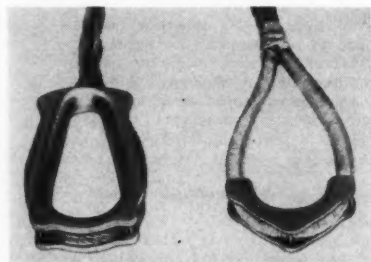
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AURORA, ILLINOIS, U. S. A.



Manufacturers Forum

Lower Sling Costs

A new 8-part braided sling, introduced by A. Leschen & Sons Rope Co., features an entirely new type of reusable thimble fitting. These Pin-Lock



thimbles are attached by pins instead of conventional hammered-down clamps and are readily removable for reuse.

Complete information about the complete Leschen sling line is available from A. Leschen & Sons Rope Co., St. Louis 12, Mo., or from your Leschen distributor.

For Safe Communication

Two new explosion-proof speaker-driver units, precision engineered for high-quality indoor and outdoor public address and sound reinforcement uses in locations where inflammable liquids,

gases, or dust creates explosion hazards, have been announced by the RCA Victor Division, Radio Corp. of America.

One of these units has Underwriters' approval for use in such industries coal pulverizing, and coal mining, or in any location where metallic dust, or similar foreign particles in the air present an explosion hazard.

Each unit is housed in a durable non-corrosive aluminum casting with a removable back cover plate, and weighs about 15½ lb. A sturdy mounting bracket permits easy installation and allows a wide variation in angular coverage. Either unit can be easily coupled to any straight or re-entrant horn.

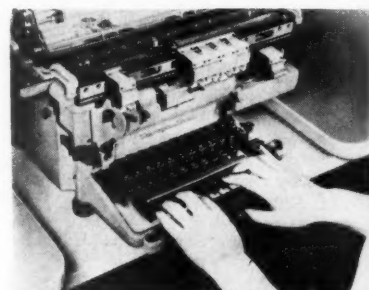
Monsters in Miniature

Abbeon Supply Co., 179-47 Jamaica Ave., Jamaica 32, N. Y., recently announced they will send a Pterodactyl, Triceratops, Mosasaur, Dimetrodon, Stegosaurus, Brontosaurus or even a Tyrannosaurus Rex to sit on your desk. Don't be alarmed though, the monsters are cast in bronze and are only three in. high mounted on the bronze finished base of a fountain pen set.

Paleontologically-minded mining men can get further information by writing to the above address.

Low-Cost Bookkeeping Machine

Completely mechanized accounting, including full description of entries, has now been brought about by the development of the new Remington Rand Low-Cost Bookkeeping Machine. Delivered with typewriter keyboard and a minimum of five registers, the Low-



Cost can be amortized at a negligible monthly rate over a ten-year period—conservative estimate of its life expectancy.

The need for an all-purpose, alphabetically descriptive bookkeeping machine of this type has long existed. Where large machines might be uneconomical, the moderate sized but fully-equipped Low-Cost machine offers complete accounting results and high output at a small over-all outlay, according to the manufacturer.

Expands Product Line



Myers-Whaley Co., Knoxville, Tenn., has just announced the development of a new Crawler Mounted Transfer Car for handling coal, rock or ore. It is reported that one feature of the car is its complete operation by a single 20-hp motor. Officials state that their new Transfer Car is the first new equipment added to their business after 45 years of manufacturing loading machines exclusively

Introduce New Transmission

A new oil-actuated 2-Speed Transmission, developed to obtain extended full-range performance from hydraulic torque converters, is announced by the Twin Disc Clutch Co.

The new transmission—designated as the Model T-302—is engineered to obtain improved performance in torque converter installations by providing a dual range of converter operation. The unit is equipped with a direct drive and single stage planetary gear system. Two ratio spreads are available: direct drive and 2.69:1 reduction, or direct drive and 3.07:1 reduction ratio.

Specific information, with complete installation data, may be secured by writing the Twin Disc Clutch Co., Hydraulic Division, Rockford, Ill.

Cut Stemming Time

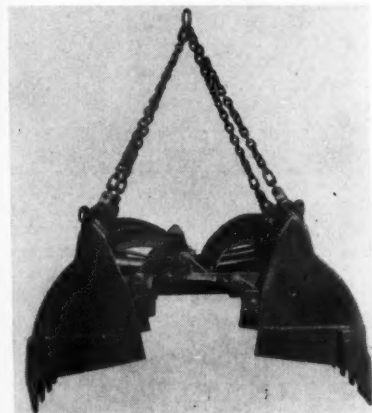
A means of cutting stemming time to seconds through the use of Quick-Seal Tamping Plugs is described in a new bulletin published by National Mine Service Co. According to the brochure, these plugs will save powder, provide more effective breakage and greatly reduce stemming time in open pits, quarries, tunnels, underground metal and nonmetallic mining operations.

Quick-Seal Tamping Plugs are made in two parts: a cylinder of asbestos paper, accordion-creased and formed into a hollow, thick-walled cylinder held in shape by a glued paper band; and a conical wooden wedge. Complete information is available from the company at Beckley, W. Va.

Announce 1/2-yd Shaft Mucker

A larger, 1/2-cu yd capacity model of the hydraulically operated Hydromucker, was announced recently by Bucyrus-Erie Co.

The heavy-duty, 2025-lb bucket has alloy steel lips and teeth and is closed by two single acting hydraulic rams mounted horizontally within the bucket yoke. These provide maximum



closing pressure at the teeth causing the bucket to bite down into the muck rather than draw away during closing like rope reeved buckets which must be hoisted to close.

For full information, contact the manufacturer at South Milwaukee, Wis.

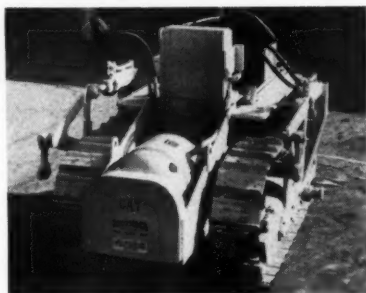
Electric Powered Bulldozer

Ever see a "cat" without an exhaust? Pictured here is a special caterpillar bulldozer that is powered electrically to eliminate dangerous carbon-monoxide exhaust gases in an aqueduct tunnel-building project in the State of Washington.

A General Electric Tri-Clad motor was installed by the Shephard Tractor and Equipment Co. of Los Angeles, manufacturer of the bulldozer, to re-

place the conventional internal-combustion engine.

The 40-hp, 900-rpm motor drives the regular transmission with four speeds forward and one reverse. It operates



on 220/440 v supplied by a trailing cable from outside the tunnel shaft.

The bulldozer will have a curved grader blade on the front just ahead of the motor and will be used to put the finishing grade in the tunnel after the mucking machine has finished its work.

—Announcements—

Adolph F. Leitner, executive vice-president, Sintering Machinery Corp. has announced that Harold E. Rowen, vice-president and general manager of the corporation, has assumed the additional responsibility of directing the sales of the company's Metallurgical Division.

Walter E. Palmer of Cresskill, N. J., is now sales manager of All-State Welding Alloys Co., Inc. He will be responsible for the coordination of sales and service to users and distributors of All-State Alloys and Fluxes in all areas.

Kennametal Inc., Latrobe, Pa., announces the appointment of Dario S. Parisi, formerly mine superintendent and mine foreman in various operations around Kittanning, Pa. Parisi will represent Kennametal in the Central Pennsylvania Area.

Barnes and Reinecke, Inc., Chicago engineering company, specializing in mechanical research and development, was acquired April 6, by Joy Manufacturing Co. Barnes and Reinecke will continue to operate under its present name and with its present personnel as a subsidiary of Joy.

Election of E. D. Powers as president of Chemical Construction Corp. has been announced. He will remain as vice-president and director of the parent firm, American Cyanamid Co. Major General William N. Porter, who had been president of Chemical Construction Corp. since 1947, was elected chairman of the Board of Directors.

CATALOGS AND BULLETINS

CATERPILLAR BULLDOZERS. Caterpillar Tractor Co., Peoria, Ill. The catalog contains model views showing every size and style of Bulldozer made by Caterpillar and cutaway views illustrating their features. Bulldozer attachments, such as the Brush, Root and Rock Rakes, the Treedozer and the Stumper, manufactured by Fleco exclusively for Caterpillar, are also discussed.

Copies of "Caterpillar" Bulldozer Line—Form 30461—are available from Caterpillar Tractor Co.

DUMP TRUCKS. The Galion All-steel Body Co., Galion, Ohio. A new catalog descriptive of the Galion line of dump bodies, hydraulic hoists and end-loaders. Full data is included on a vast collection of equipment ranging from light duty pick-up truck units to huge twin telescopic, three-stage tandem axle trailer dumps. For catalog copies, ask for L-6512.

HELICAL GEARS. Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill. Helical gear drives—their advantages, fields of application and correct selection—are discussed in this new, illustrated 16-page Book No. 2451. All factors governing correct selection are described in detail. The right drive for any application can be chosen readily, because horsepower ratings for all drives, in all ratios, for various input speeds, are shown in tabular form. Book No. 2451 will be sent to any interested reader on request.

MINING TOOLS. Carbology Dept. of General Electric Co., Detroit, Mich. Latest information on when and how to sharpen tungsten carbide mining tools, equipment required and best techniques to follow is included in a new 26-page catalog and maintenance instruction manual.

The manual, CM-110, covers tungsten carbide roof bolting drills, cutter, finger and auger drill bits as well as recommended grinding wheels to use. It supersedes CM-100-E issued last year.

NEW WIRE ROPE SLING HANDBOOK. A. Leschen & Sons Rope Co., St. Louis 12, Mo. A 64-page handbook on Leschen slings and fittings is now available. It is printed in a handy 4 1/4 x 6 1/2" size—for convenient reference on the job or in plant offices. It contains more than 100 illustrations, showing standard wire rope slings, grommet slings and multiple part slings, the latter including flat-laced, hand-braided slings. Charts show correct calculations for determining the size of slings required, and correct sling angles in relation to loads. Write for it to A. Leschen & Sons Rope Co.

V-BELTS. Thermoid Co., 200 Whitehead Rd., Trenton, N. J. An eight-page, four color, catalogue on V-Belts for industrial use. Prices, dimensions, weights and construction details are presented.

WATER HOSE. B. F. Goodrich Co., Akron, Ohio. In addition to hose for general water service, the catalog describes types of water hose designed for specialized uses. These include long length, heavy duty hose for construction projects, road building and other high pressure uses; large diameter hose for high pressure water and air service in pile-driving operations, hydraulic bank grading, stripping and sluicing and for heavy duty service in mines and quarries where abrasion on cover is severe.

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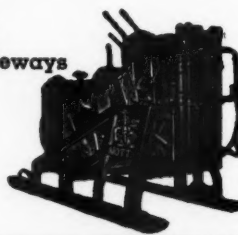
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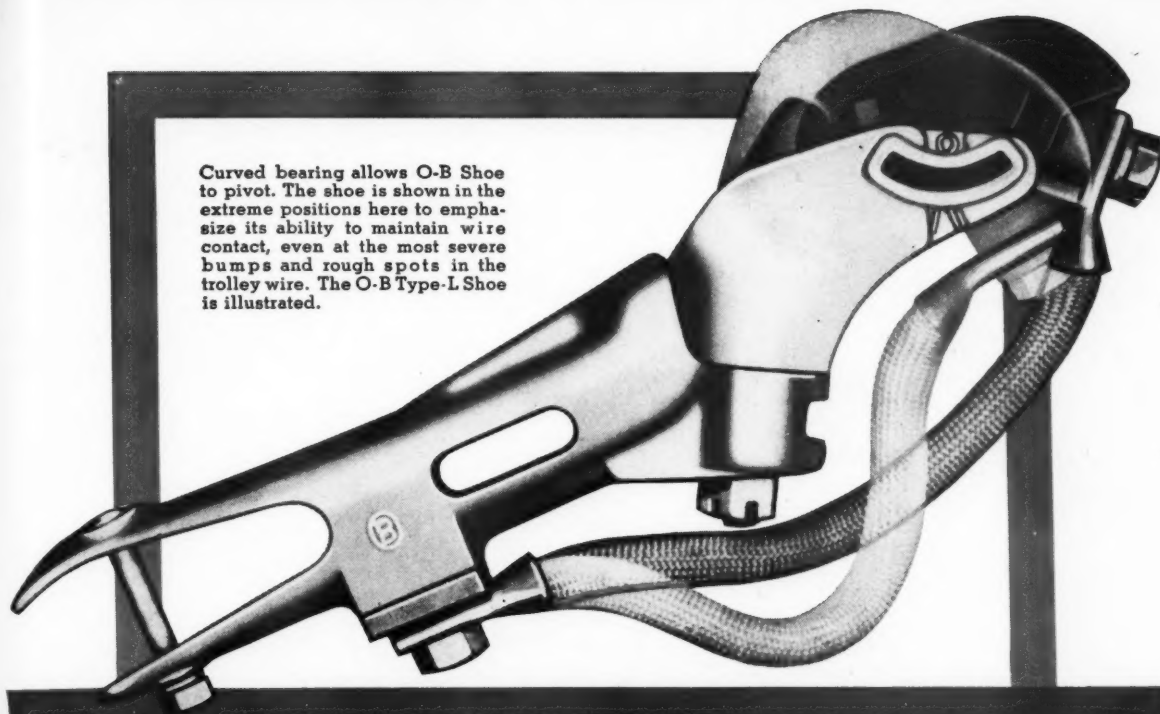
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Curved bearing allows O-B Shoe to pivot. The shoe is shown in the extreme positions here to emphasize its ability to maintain wire contact, even at the most severe bumps and rough spots in the trolley wire. The O-B Type-L Shoe is illustrated.



O-B Shoes Stop Dewirements and Wire Burning because they HUG the wire!

Pivoting O-B Trolley Shoes give you these advantages — HIGH SPEEDS WITHOUT DEWIREMENTS — LONG LIFE FOR TROLLEY WIRE AND CURRENT COLLECTORS. Sounds worthwhile, doesn't it? Here's how they give you better collector performance:

O-B Trolley Shoes *pivot* at any bump or irregularity in the wire. Thus either the trailing end or the leading end of a shoe is always in contact with the wire as the shoe passes a jog. A wheel can be jarred hard enough by the same jog to make it lose contact. That causes dewirements. Shoes avoid that

trouble by hugging the wire at all times.

When a collector breaks contact, there's some arcing and wire-burning. Metal burns away. Lumps appear on the wire and collector. Wheels bounce, arc, and burn at the least jounce. Shoes avoid that trouble by hugging the wire at all times.

Save wire and save collectors by switching to wire-hugging, burn-free O-B Trolley Shoes!

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EDISON R-4 ELECTRIC CAP LAMP

The dependable and better light of the Edison R-4 Lamp is transferring the production advantages of today's modern equipment into steadily climbing production figures. Let us show you how its brilliant, unfailing beam gives miners the light they need to work mechanized equipment at its greater capacity, safely.



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Dispatcher's orders sent instantly and simultaneously to all motormen who can also reply or communicate with each other *while trips are in motion*. Coordinates haulage movements with production demands.

M.S.A. HoistPhone also available for continuous voice communication between hoisting engineer and cage, at any level, and when cage is in motion.



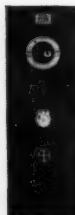
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Here's the practical answer to collecting dust created by rotary or percussion drilling. An ideal aid to roof-bolting. U. S. Bureau of Mines Approved. Come in for the facts!



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Dependable, steady flame, guarded from drafts by improved ventilation and specially designed openings. Easy-to-read standard size graduated chimney. 70% of parts interchangeable with standard size model.



M.S.A. METHANE RECORDER

Provides a continuous record of the concentrations of methane in return air at all times. Immediately indicates unusual gas conditions due to interruptions in ventilating currents, and serves as a valuable guide for regulating the volume of air required to maintain proper and economical ventilation standards.



M-S-A DUSTFOE #55 RESPIRATOR

Tops in worker acceptance! Users like its lightweight comfort, its streamlined design that avoids "blind-spots"; its easy breathing quality. Effective filtering action gives maximum breathing protection. U. S. Bureau of Mines Approved.



M.S.A. SELF-RESCUER

For immediate breathing protection in emergencies caused by fire or explosion; vital to the miner while traveling through carbon monoxide to fresh air. Can be carried by the miner or stored in convenient steel caches anywhere in the mine.

M.S.A. BOOTH NO. 1009
at the COAL SHOW
Full of New Production-Safety Ideas!

It's "Curtain Time" at the Coal Show, and M.S.A. will again show many products to help you better your production, boost overall mine safety. You'll want to see, and learn, first-hand, how these items can fit into your mining plans. You are cordially invited to stop in and visit.



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Fast, economical distribution of rock dust right up to the working face. Readily transported on shuttle cars, on conveyor belt or rubber tires. Other electric and compressed air models available to meet your every need.

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